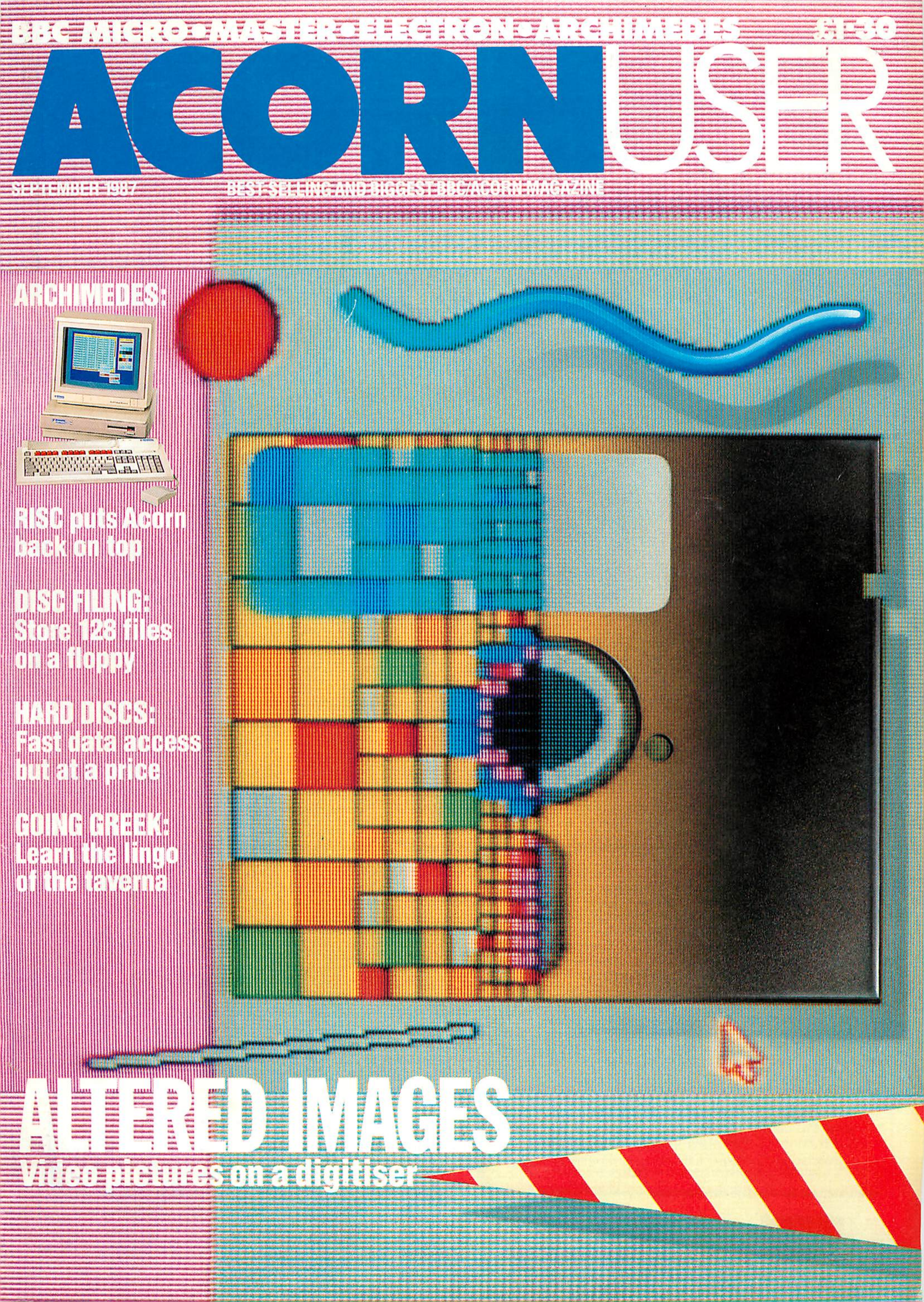

BBC MICRO • MASTER • ELECTRON • ARCHIMEDES
£1·30
ACORN USER
SEPTEMBER 1987
BEST SELLING AND BIGGEST BBC/ACORN MAGAZINE
ARCHIMEDES:
RISC puts Acorn back on top
DISC FILING: Store 128 files on a floppy
HARD DISCS: Fast data access but at a price
GOING GREEK: Learn the lingo of the taverna
ALTERED IMAGES
Video pictures on a digitiser

COMPATIBLE WITH THE BBC B, B+, MASTER SERIES, AND ACORN ELECTRON

CODENAME: DROID

Stryker's Run – Part 2

The Dramatic Loading Screen

Climbing up a rope (SURFACE DEFENCE)

Flying with a jet-pack (ANCIENT SHRINE)

The elusive "Herbert" Droid (CREW'S QUARTERS)

Crawling under a crane (MISSILE FACTORY)

Commander John Stryker is back in CODENAME: DROID

Stryker's Run was one of our most successful releases of 1986. It stayed at the top of the BBC Micro software charts for six weeks and received several glowing reviews: "The graphics are stunning . . . This should be in every collection" enthused A & B Computing.

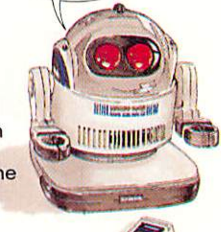
Now CODENAME: DROID presents a new challenge for Commander John Stryker. He has been commissioned by the Allied Nations to undertake another perilous mission in their continuing struggle against the warmongering Volgans.

His task is to locate and seize the Volgans' latest weapon: a new spacecraft (codenamed the Z11) which is equipped with the revolutionary matter/anti-matter warp drive facility. Stryker must land on the mysterious planet Volga, penetrate the Volgans' underground defence systems, find the spacecraft and requisition it.

As Stryker descends below the planetary surface, he will pass through 4 different zones of Volgan activity:-

- The Surface Defence — an array of steel girders, ropes and chains lies coldly between the crusted white rock walls.
- The Ancient Shrine — a stone-walled temple bedecked with hideous gargoyles and rusting chandeliers.
- The Crew's Quarters — the Volgans' relaxation area: tables and chairs are arranged invitingly amongst the essential ventilation pipes.
- The Missile Factory — clinical psuedo-metallic walls surround the missiles, bombs, and computers of the evil Volgan race.

Your character in the game can jump, run, kneel, crawl, climb up and down ropes, fire his laser blaster and drop mines. He can also fly for short distances using his jet-pack, and access information via his wrist terminal computer.



BBC Micro Cassette......... £9.95 Acorn Electron Cassette... £9.95
BBC Micro 5¼" Disc....... £11.95 Acorn Electron 3½" Disc. £14.95
BBC Master Compact 3½" Disc £14.95

The screen pictures show the BBC Micro version of the game. The graphics of the Acorn Electron version are indentical.

Prize Competition

If you complete the entire CODENAME: *DROID mission*, you can enter our competition.
Prizes include 1 talking remote-controlled robot, 5 small remote-controlled robots, £150 in cash, and competition certificates.
Closing Date: 29th February, 1988.



ACORNSOFT

Dept. CD6, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453.

Please make all cheques payable to "Superior Software Ltd".





24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE
- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

MICRO MEDIA Computer Supplies Ltd. Dept AU

0707 52698 or 0707 50913

Freepost, Rydal Mount, Baker Street
Potters Bar, Herts EN6 3BR (NO STAMP REQUIRED)

SUMMER SALE

Special Offer Prices valid until Sept 10th 1987

5¼ Micro Media Brand Discs

	10	20	30	50	100
SS/DD	6.99	13.10	18.70	29.50	55.80
DS/40T	8.50	16.00	22.75	35.90	67.60
DS/80T	9.99	18.70	26.35	41.05	76.35
DS/HD for PCAT	24.15	46.25	66.25	105.25	200.10

5¼ Reversible discs (Flippy's)

Have two write protect notches & index holes. Suitable for single sided drives.

	10	20	30	50	100
	10.25	19.55	27.15	42.25	78.45

3½ Micro Media Brand

	10	20	30	50	100
SS/DD	19.99	38.40	55.50	87.25	163.90
DS/DD	21.99	42.55	61.60	96.90	182.30



All discs supplied are with labels, 5¼" write protects, envelopes & hub rings.

Discs purchased direct from one major manufacturer. 100% certified error free – lifetime guarantee.

PRICES INCLUDE V.A.T.



5¼ Rainbow Discs come in five colours

	20	50	100	250	500
SS/DD	13.20	30.75	57.10	134.50	252.45
DS/40T	14.35	33.10	60.70	141.45	262.20
DS/80T	15.20	35.20	64.85	148.75	276.00

5¼ Unbranded Discs

	20	50	100	250	500
SS/DD	9.65	22.45	41.40	97.10	181.13
DS/40T	10.95	25.00	45.55	105.25	193.20
DS/80T	11.85	26.73	49.55	116.45	216.20

3½ Unbranded Discs

	10	30	50	100	150
SS/DD	14.95	42.95	61.50	111.65	164.50
DS/DD	16.70	48.30	78.20	147.20	212.20

SUMMER SALE · SUMMER SALE · SUMMER SALE · SUMMER SALE · SUMMER SALE

Monitor Swivel Bases



Pan tilt revolves around 360 degrees 12.5 degrees tiltable up and down Adjustable by front mechanism.

55x280x260mm for 12" Monitors		55x355x320mm for 14" Monitors	
1	13.25	1	16.70
3+	12.60 ea	3+	15.90 ea
6+	11.95 ea	6+	15.05 ea

Adjustable Copy Holder

A4 adjustable desk clamping. Magnifying cursor line. Paper thickness adjustment. Paper height adjustable clip.

A4 Version 24.00
Holds up to 300g

Desk Top Version 13.69
Holds up to 1000g

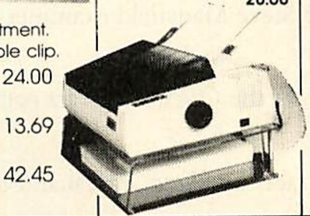
A3 Version 42.45
Holds up to 1400g

Printer Stand

5mm perspex

80 Column Version
400 x 310 x 100mm **22.80**

132 Column Version
600 x 310 x 100mm **28.60**



Mobile Printer Stand

Rugged steel frame. Height adjustable basket for output paper & base shelf for input paper. Self assembly – includes castors.

80 column £50.00
132 column £65.00

The Space Saver



Paper feed and refold positioned one above the other. Dial controlled paper feed with adjustable deflectors ensures smooth flow and automatic refolding.

80 column 414x380x460mm		132 column 530x380x460mm	
1	34.40	1	43.00
3+	32.10 ea	3+	40.70 ea
6+	30.50 ea	6+	38.65 ea

Printer Ribbons

	3	6	12
Acorn AP80	7.25	13.80	25.55
AP100	7.40	14.15	26.20
Brother M1009	8.10	15.50	28.95
Colours	12.30	24.60	49.20
HR15 MS	10.70	20.70	39.35
Fabric	11.05	21.40	40.70
Canon PW1156/1080	7.95	15.20	28.30
Centronics GLP	8.10	15.50	28.95
Colours	12.30	24.60	49.20
Epson FX/MX/RX 80/85	7.25	13.80	25.55
Colours	13.20	26.40	52.80
LX/GX 80	6.90	13.10	24.15
Colours	12.60	25.20	50.40
MX/FX 105	8.80	16.90	31.75
LQ 800	10.00	19.30	36.60
Juki 6100 MS	7.25	13.80	25.55
5510	7.25	13.80	25.55
Colours	13.20	26.40	52.80
Kaga KP810/910	7.95	15.20	28.30
Colours	13.20	26.40	52.80
M/Tally MT80 MS	10.70	20.70	39.35
NEC PC8023	11.75	22.75	43.45
Colours	15.30	30.60	61.20
Panasonic KXP110/1080	10.70	20.70	39.35
Colours	19.35	38.70	77.40
Seikosha GP80	7.25	13.80	25.55
GP100	7.40	14.15	26.20
Shinwa CP80 MS	10.70	20.70	39.35
Star NL10	18.60	36.60	71.10

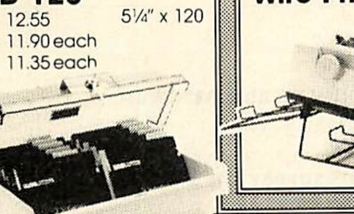
Colours available – Red/Brown/Blue/Green & Yellow

If the ribbon you require is not listed please let us quote

The above is a small selection of the 250 different ribbons we stock. We shall be pleased to find your ribbon, however old or obscure.

MD 120

5¼" x 120
1 12.55
3+ 11.90 each
6+ 11.35 each



Wire Printer Stand

stacks print-out in document tray automatically. Suitable for most standard printers. Made of safety coated steel wire.

For 80 column £14.80
For 132 column £16.60

MD 50

5¼" x 50
1 7.80
3+ 7.40 each
6+ 7.10 each

MD 100

5¼" x 100
1 10.80
3+ 10.30 each
6+ 9.80 each

MM 40



3½" x 40
1 8.30
3+ 7.90 each
6+ 7.50 each

MM 80



3½" x 80
1 10.95
3+ 10.40 each
6+ 9.90 each

Computer Labels

Continuous fanfold, sprocket fed

	Price per 1,000	3,000
70 x 36	4.80	13.20
89 x 36	4.90	13.50
89 x 49	6.80	18.30
102 x 36	5.20	14.40

Please state no. of labels across the sheet (1, 2 or 3)

Computer paper

Plain fanfold, micro perf edges

Size	Weight gsm	1000s per box	Price per box 1 box	3 bxs +
11x9½	60	2	16.50	46.80
	80	2	20.40	56.10
Exact A4 11⅔x9¼	70	2	27.60	73.50
	90	1	17.40	43.80

A4 Fixed tractor paper available

ALL PRICES INCLUSIVE OF POSTAGE & PACKING AND V.A.T.

MICRO MEDIA
Computer Supplies
Freepost, Rydal Mount, Baker Street,
Potters Bar, Herts. EN6 3BR



Access & Visa



Out of Office Hours
0707 52698

Orders despatched 24 hrs.
Please allow 5 days for delivery.
For next day delivery, please ring for details. Postage covers U.K. only.

A **Catalogue** is available with a more comprehensive range of products including – 3M & Verbatim discs – a wider choice of paper labels, ribbons and accessories.
Ring or write to obtain your copy now!

Educational and HMG orders accepted. For official orders/invoice/credit orders there is a minimum order value of £15.00 excluding V.A.T. Any order under £15.00 will be subject to £3.00 handling charge.

Personal callers welcome
Weekdays 8.30am - 5.30pm
Saturdays 10.00am - 4.00pm

-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-

ACORN USER

ISSUE No 62 SEPTEMBER 1987

EDITOR
Tony Quinn

DEPUTY EDITOR
Steve Mansfield

TECHNICAL EDITOR
Graham Bell

SUB-EDITORS
Stuart Anderton
Chris Jones

EDITORIAL SECRETARY
Colette Curley

TECHNICAL ASSISTANT
Robert Miller

ART DIRECTOR
Mike Lackersteen

ART EDITOR
Liz Thompson

ASSISTANT ART EDITOR
Paul Holmes

EDITORIAL MANAGER
Ellen Brush

PRODUCTION ASSISTANT
Teri North

GROUP ADVERTISEMENT DIRECTOR
Stefanie Blower

ADVERTISEMENT MANAGER
Gary Lucas

SALES EXECUTIVES
Thomas Rashid
Shane Hussien

ADVERTISEMENT PRODUCTION
Jonathan Marsh

ADVERTISEMENT ASSISTANT
Nicky Lewis

MERCHANDISING MANAGER
Sarah Bullard

MERCHANDISING ASSISTANT
Seran Anderson Haddick

PUBLISHING DIRECTOR
Michael Potter

EDITORIAL DIRECTOR
Christopher Ward

NEW USERS

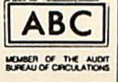
REVIEWS

EDUCATION

BUSINESS

REGULARS

Published by Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF. Tel: 01-836 2441. Subscriptions: Contact Gail Fairhall, Redwood Publishing Ltd, Lambourn Woodlands, Newbury, Berks. Tel: (0672) 40888. UK £17.50; Europe £25; Middle East £30; Americas, Africa £35; rest of the world £40; (prices include p&p for 12 issues). Printed by Watmoughs Ltd, Bradford. Typesetting by Tabloid Fotoset, London. Colour reproduction by Clerkenwell Colour, London. Print production by Aquarius Print and Design, London. Distributed by Comag, Tavistock Road, West Drayton.



FEATURES

COVER

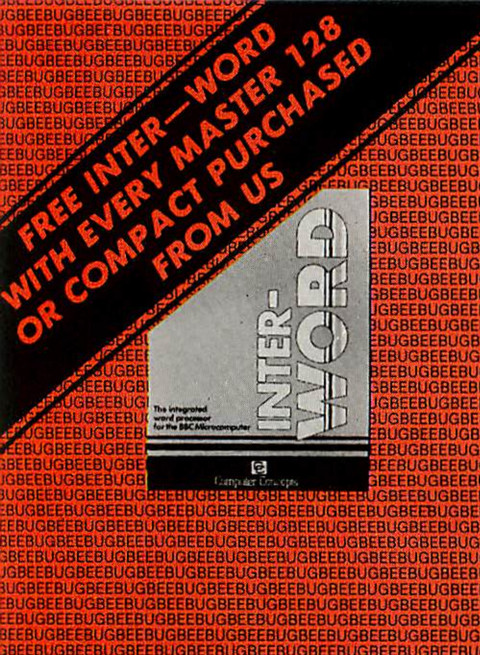


Illustration by Paul Allen

NEXT MONTH

Acorn User goes back to school, Joe Telford on sorting, Exploring Basic 5, downloading weather maps from the radio. Plus; win an Archimedes

© Redwood Publishing Ltd 1987. All rights reserved. No part of this publication may be reproduced without prior written permission of the publisher. The publisher cannot accept any responsibility for claims or errors in articles, programs or advertisements published. The opinions expressed are those of the authors and do not necessarily represent those of the publisher, Acorn Computers Ltd or Acornsoft Ltd. Acorn, Acornsoft and the acorn symbol are the registered trademarks of Acorn Computers Ltd and Acornsoft Ltd. Acorn User welcomes contributions from readers – please supply a suitable sae if you want your submission to be returned. ISSN 0263 7456.

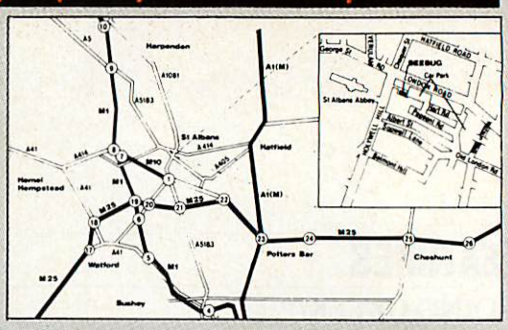


5% OFF!

5% DISCOUNT TO BEEBUG MEMBERS ON ALL HARDWARE/SOFTWARE
Only if you quote your membership number

The products in this price list are available in our showroom in St. Albans and by mail order. Telephone your order on 0727 40303 or send the order form to:

BEEBUG MAIL ORDER
Dolphin Place, Holywell Hill,
St. Albans, Herts AL1 1EX
Tel: 0727 40303—Multi-Lines
Alternatively come along and see us. We are open Mon-Sat 9-5.30 and Thursday 9-8.00pm



*ORDERS CAN NOW BE PLACED VIA MICRONET. SEE US ON PAGE 800909 OR SIMPLY TYPE "*BEEBUG#"*

PRICES INCLUDE VAT.

THERE ARE TWO PRICES LISTED BELOW FOR EACH ITEM. THE FIRST IS OUR NORMAL PRICE, THE SECOND OUR MEMBERS PRICE.

COMPUTERS

Master 128 and Compacts
Down in Price
Master 128 only £414.11
Compact Colour System- £546.25

0199G	Compact Entry System	375.00	356.25
0198G	Compact TV System	390.00	370.50
0197G	Compact MonoSystem	440.00	418.00
0196G	Compact Colour Sys.	575.00	546.25
0227F	Second 3.5" Disc Drive	108.00	102.60
0201B	Compact RS232 Interface	29.90	28.41
0211C	PAL TV Adaptor	29.90	28.41
0250C	Compact 5.25" Disc Lead	12.32	11.70
0298B	Compact Printer Lead	9.77	9.29
0200G	Master 128	435.91	414.11
0202G	Master ET	359.43	341.46
0240C	M128 Manual 1 ADJ22	14.95	14.20
0241C	M128 Manual 2 ADJ23	14.95	14.20
0242C	M128 Adv. Ref Man.	19.00	18.05
0234B	M128 Econet Module	48.88	46.43
0235B	M128 Eprom Cartridge	15.18	14.42
0780B	Peartree ROM Cartridge	9.00	8.55
0781B	Care Elec. Cartridge	8.95	8.50
0782B	Care 4 Way Cart.	14.95	14.20
0783B	Peartree MR8000 Cart.	45.95	43.65
0230C	65C102 6502 "Turbo"	119.00	113.05
0231D	80186 Co-Processor	228.85	217.41
0233F	Universal 2nd Proc.	83.00	78.85
0237F	Acorn IEEE Interface	322.00	305.90

PRINTERS

0299G	Panasonic KX-P1081	180.00	171.00
0311G	Taxan Kaga KP815	342.11	325.00
0316G	Taxan Kaga KP915 15"	440.00	418.00
0322G	LX86 PRINTER	275.00	261.25
0327G	Star NL-10	285.00	270.75
0328G	Epson FX800	405.00	384.75

MONITORS

0501G	Kaga KX118 Green	100.00	95.00
0502G	Kaga KX119 Amber	100.00	95.00
0556B	BNC monitor lead	3.90	3.70
0503G	Zenith 123 12" Green	83.00	78.85
0504G	Zenith 122 12" Amber	87.00	82.65
0530G	Microvitec 1431 Mon.	239.00	227.05
0531G	Microvitec 1451 Mon.	289.00	274.55
0550B	1.0m Mon. Lead RGB	5.75	5.46
0573C	14" Swivel Mon. Stand	14.50	13.78
0535G	Supervision 625 RGB	379.50	360.53
0536G	Supervision 620 RGB	318.55	302.62
0555B	Supervision Mon.Lead	7.00	6.65
0551E	Single Master Plinth	16.10	15.30
0559F	Double Master Plinth	28.75	27.31
0552E	Single BBC B Plinth	12.65	12.02
0553F	Double BBC B Plinth	23.00	21.85
0554B	VDU Cleaner	4.65	4.41

DISC DRIVES

0224G	Master Disc Drive Unit	316.00	300.20
0600F	Cumana CSX100 40	106.95	101.60
0601G	Cumana CDX200 40	215.00	204.25
0602F	Cumana CSX400 40/80	142.60	135.47
0610F	Cumana CS100 40	126.50	120.18
0603F	Cumana CS400 40/80	162.15	154.04
0604G	Cumana CD800S 40/80	286.35	272.03
0614F	Cumana CS100E	118.45	112.53
0615F	Cumana CS400E	155.00	147.25
0611A	Cumana Disk Guide	1.90	1.81
0650B	10 Memorex Discs SS 40	15.50	14.73
0651B	10 Memorex Discs DS 80	25.50	24.22
0669B	10 Memorex 3.5" Discs	25.00	23.75
0652B	Disc Head Cleaner (5.25)	9.65	9.17
0648B	Disc Head Cleaner (3.5)	9.65	9.17
0653B	Disc Case (10 discs)	2.25	2.14
0654C	Disc Box (holds up to 50)	10.00	9.50
0655C	Lockable Disc Box (50)	13.80	13.11

WATFORD HARDWARE

0214B	Watford DDFS Kit	56.35	53.53
0216B	Watford DFS Manual	6.95	6.60
0219B	Watford 8271 DFS Kit	62.10	59.00
0702B	Watford 32K RAM Card	67.28	63.91
0709D	Watford Eprom Eraser	33.35	31.68
0717B	Watford Sideways ZIF	17.83	16.93
0736B	Watford 12 ROM Board	36.80	34.96
0737B	Watford Battery	4.37	4.15
0752B	Watford Diagnostic Disc	23.00	21.85
0755B	Write Protect Mk12	2.76	2.62
0739C	Watford Video Digitiser	113.00	107.35
0756B	Eureka Card	102.00	96.90
0429B	Watford NLQ Epson	28.75	27.31
0748F	Co-Pro Adaptor	55.00	52.25







Prices Include VAT. There are two prices listed below for each item. The first is our normal price, the second our members price.

OTHER HARDWARE

0701B	Aries B32 RAM Card	93.15	88.49
0740B	Aries B12 ROM Board	46.00	43.70
0749B	Aries B12C Adaptor	5.87	5.57
0704B	ATPL ROM Board BBC	39.67	37.69
0735B	ATPL Battery Backup	17.37	16.50
0746B	ATPL ROM Board BBC +	33.35	31.68
0707A	6264 8K RAM	3.68	3.50
0715A	Dust Cover BBC B/B+	3.45	3.28
0734A	Dust Cover Master	4.60	4.37
0718B	Delta 3B Single Joystick	9.99	9.49
0719B	Delta 3B Twin Joysticks	17.00	16.15
0720B	Delta 14B Joystick	12.50	11.88
0721B	Delta 14B/1 Interface	13.00	12.35
0773B	Delta 3S Compact Joystick	9.99	9.49
0774B	Delta 3SO Optical F/back	18.00	17.10
0741A	Delta ASC/B Interface	8.50	8.07
0764F	Red Box Starter System	129.00	122.55
0765D	Red Leader	59.95	56.95
0766D	Red One	34.95	33.20
0767D	Red Two	34.95	33.20
0775C	Red Five	49.95	47.45
0770B	13 amp spike plug	11.99	11.39
0771B	3 way spike adaptor	15.00	14.25
0772B	4 way spike strip plug	14.50	13.78

COMPUTER CONCEPTS

1118B	Spellmaster	55.00	52.25
1117B	Interword	50.03	47.52
1110B	Intersheet	44.85	42.61
1114B	Interchart	29.90	28.41
1116B	Interbase	67.85	64.46
1100C	Wordwise Plus	46.00	43.70
1102B	Wordwise	28.75	27.31
1104B	Printmaster (Epson)	28.00	26.60
1115B	Speech System incl.TTS	30.99	29.44
1108B	Acorn Speech Proc (5220)	10.00	9.50
1111B	Hi Intersheet Disc	5.75	5.46
1112B	Hi Wordwise+ Disc	5.75	5.46
1113B	Caretaker ROM	28.75	27.31

BEEBUG MODEM

0762E	BEEBUG Magic Modem	84.11	79.90
0763E	Modem + Command	104.20	99.00

Carriage

Carriage is denoted by the letter contained in the stock code. A-50p, B-£1, C-£2, D-£3, E-£3.75, F-£5.50, G-£7. When ordering several items, use the highest price code and half of each subsequent code. For courier delivery use code G.

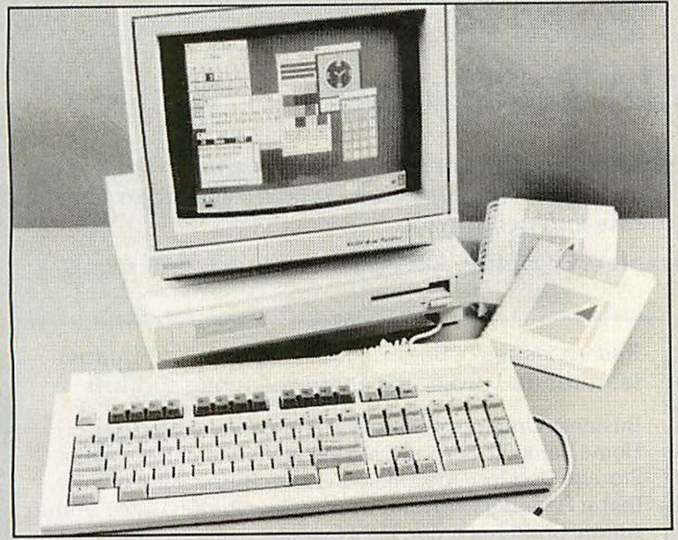
Offical Orders

Orders for £25 or over are welcome from education and government bodies. Alternatively pro-forma invoices are available on request.

Credit Cards

Access and Visa orders are welcome, and may be placed by letter or telephone.

☎ (0727) 40303



Archimedes

Acorn's New RISC Computer

Introducing the BBC Micro 300 series

Features: 32 Bit RISC technology, IBM style keyboard with mouse, BBC style operating system, BBC BASIC V (with editor), ADFS, window environment with desk top manager, 6502 emulator, stereo sound, parallel and serial printer outputs. Expansions include: Econet card, Podule expansion system, 20Mbyte Winchester, 2nd floppy disc drive.

We are pleased to accept official orders.

Acorn have now announced their exciting new range of computers - the BBC Micro 300 series. Currently there are two different versions - BBC Micro '305' which has 0.5 Mbytes of RAM and the '310' which has 1 Mbyte. The basic entry system is supplied complete with keyboard and monitor plinth unit which includes the built-in 3.5" disc drive. Both models can also be supplied with either a Mono green screen monitor or a Colour RGB Monitor.

Availability - Full production is expected in the Autumn, with small quantities available sooner. To ensure that you are one of the first people in the country to be supplied with an Archimedes simply fill in the PRIORITY ORDER FORM opposite.

Access/Visa accounts will not be debited and cheques not cashed until your new computer is actually sent.

Prices quoted include VAT and 5% BEEBUG members discount.

Priority Order Form

Computer	Basic Model	with Mono Monitor	with Colour Monitor
BBC Micro 305	872.91❑	927.53❑	1091.41❑
BBC Micro 310	955.94❑	1010.56❑	1174.44❑

Please ✔ appropriate box

Access/Visa No. ________________

Card Expiry Date __/__

Name: ________________

Address: ________________

____

____

Post Code: ________________

Beebug Member Y/N: ___ No.: ________



Don't let your Computer ROT!

Your BBC Micro/Master Has So Much Potential – **Don't Let It Go To Waste**

At Beebug we are keen to help you get serious with your computer. Our magazine (currently sent out to 20,000 members) aims to stimulate you with new and interesting ideas and to keep you up to date with the latest developments and programs.

Whether you are a hardened computer buff or a complete beginner, Beebug has much to offer you.

As A Member Of Beebug You Would Benefit From:

- Free access to our technical support team, to obtain impartial advice and help on any computer hardware, or software problems.
- A swift mail-order service for all your hardware & software needs at competitive prices, with 5% members discount.
- A showroom with knowledgeable staff on hand, where you can try out the latest hardware, peripherals and software.
- Free personal adverts in the magazine to sell your unwanted kit.
- A Trade-In service to upgrade your BBC to a Master.

A New Members Pack, including screen planning sheets, key strip, computer reference card, a 56 page introduction to your computer, membership card, mag. indexes & latest magazine.

Recent issues of Beebug have included informative features and programs on the following subjects:

Business Graphics, Sideways Ram Construction Project, Home Banking, Sorting Data Files, Character Definitions, Storage Oscilloscope, Master Printer Buffer, File Security, Letter Headings, Virtual Arrays, View Printer Driver, Auto-Alarm, Chart Recorder, Help System.
As well as these we regularly include articles for beginners and experts, workshops, reviews, news, hints & tips and much, much more.

FOR A FREE BEEBUG INFORMATION PACK PHONE St. Albans (0727) 40303

I would like to subscribe to Beebug for 1 year and receive a new members pack and the next 10 issues of the magazine.
My machine is a BBC/Master/Compact. Delete as appropriate.

Name ____________________

Address ____________________

____

____

Signature ____________________

I enclose a cheque for £______/Please debit my Access/Visa account with £______ Card expiry ____/____

Card No. | | | | | | | | | | | | | | | | |

VISA

Subscriptions may now also be placed on Micronet 800. Just type *BEEBUG #

All payments must be in pounds sterling. Cheques must be drawn on a UK bank.

Subscription Rates

UK, BFPO, Ch Is	£12.90
Rest Of Europe	£19.00
Middle East	£23.50
America & Africa	£26.00
Elsewhere	£28.00

Send To Beebug, Dept. AU9, Dolphin Place, Holywell Hill, St. Albans, Herts. AL1 1EX.

Or Phone St. Albans (0727) 40303

BEEBUG

Stop The Rot And Join Now

NEWS

News in brief

■ The MicroStuffer is an inexpensive 64k printer buffer. It works with standard parallel printers and costs £50. Details from Frontier Software on (0423) 67140.

■ Another BBC micro user group has sprung up – this time in India. Located in the capital, New Delhi, the group has started a newsletter, enigmatically named Unicorn News. Should you want to get in touch with the group it can be contacted at: 13A/75, WEA, Karol Bagh, New Delhi 110005, India.

Name change is music to Hybrid's ears

Peartree has had to change the name of its synthesiser unit for the BBC micro which, until now, had been called the Music 7000. In future it will be known as the Music 87.

The change has come after complaints from Hybrid Technology, the company responsible for the Music 500 and 5000



Names row two: the Music 5000

synthesisers, the Ample music language and the 'thousand' series of add-ons – including the Music 4000 keyboard.

Hybrid claimed that the name of the Peartree system would lead people to believe it was a Hybrid product. In fact, the product has nothing to do with Hybrid, and isn't supported by the company.

Row blazes over Arc name

by Steve Mansfield

The BBC has been criticised for giving its name to two of the Archimedes micros.

Research Machines (RM) and the British Micro Federation (BMF) have separately issued statements claiming that the use of the BBC name is 'unethical' and 'damaging'.

Behind the complaints is the belief that schools should be using 'standard' IBM/MS-DOS business micros.

The RM statement was issued on the day of the Archimedes' launch. It questioned the BBC giving its name to a commercial product, and claimed the endorsement will lead teachers into buying a machine which is heading down a 'cul-de-sac away from developing standards'.

RM is predicting the major growth in the education market will be in higher education – precisely the area where Acorn is likely to be most successful with the Arc.

But Richard Steggall, the marketing communications manager of RM, claims that the company is not worried about the machine itself: 'In most applications it won't have much advantage. When it has lots of software it will be a threat.'

The BMF is headed by David Fraser of Microsoft, a company which clearly has an interest in seeing more MS-DOS machines in the expanding education market. The BMF's complaint revolves around the use of a non-business standard operating system in schools, claiming that students will be inadequately trained for computers in the workplace.



Archimedes: at the centre of names row number one

The BBC's reaction was surprise. BBC Enterprises' press officer, Ian Duncan, said the Corporation 'is not starting any new developments. It's a continuing part of the original computer literacy project.

'It's through the use of BBC micros that computers have got into schools in the first place,' he continued. 'To bring in something totally new would be irresponsible.'

Acorn recognises the value of MS-DOS in vocational training, and offers a compatible co-processor for the Master. Acorn spokesman Michael Page declined to comment on the RM statement, saying it was a matter for the BBC. But he accused David Fraser of having a vested interest and being out of touch with educationalists' needs. Page said Fraser had contacted neither the Department of Education and Science nor the Department of Trade and Industry before making the statement.

■ Acorn has dropped the prices of the Master series. The Master 128 has been chopped by £100 to £399. The Compact's entry level system is now £349 from £385, the TV system is down £36 to £363, the mono system is down by £70 to £399 and the colour system has dropped by £50 to £549.



The MK III AMX Mouse is a product of Swiss precision and the result of a world-wide search to find a worthy successor to the AMX Mouse MK II.

The new Mouse has been specifically chosen to be the perfect partner to the ever expanding range of AMX software. The unique patented design includes high resolution D.P.I. and superior ball technology to ensure that contact between the Mouse and the surface is constant at all times.

There's a new shape too, that fits comfortably in the hand.

The AMX Mouse MK III costs only £34.99 or you can join the great "Mouse-Swap". Part exchange your old Mouse for the MK III for only £29.99.

*SUPERART

AMX MOUSE MK III PLUS SUPERART 16K ROM, PLUS DISC £79.99

Acknowledged as the most sophisticated, yet easy to use paint package available for the BBC Micro, it's no wonder over 20,000 have already been sold.

'Superart' features include cut, copy, paste, move, rotate, plus many, many more such as fantastic spray and zoom facilities.

Available for BBC B, B+; Master 128, and Master Compact. Please state which version is required when ordering.

SUPERART (ONLY) £49.99
PICTURE GALLERY 2 × FLIPPY DISC £24.99

Instant art! A collection of fine drawings produced by acclaimed artists using superart.

*STOP PRESS

AMX MOUSE PLUS STOP PRESS 2×16K ROM, 2×DISC £79.99

The most highly acclaimed desktop publishing software available for the BBC Micro. Already thousands of users are producing professional documents, newsletters, flyposters etc. in fact anything where text and graphics are required.

'Stop Press' comes complete with 16 variable typefaces.

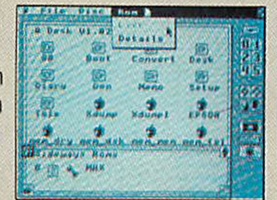
Available for the BBC, B+ and Master 128. Please state which version is required when ordering.

STOP PRESS (ONLY) £49.99
EXTRA! EXTRA! 2 × FLIPPY DISC £24.99

300K fantastic clip art, over 25 fonts and utility software.

*MAX 16K ROM £19.99

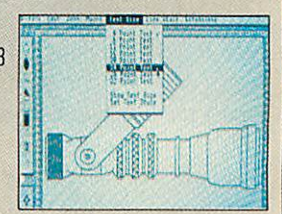
MAX provides an easy to use graphic based front end to your computer's disc filing system including a comprehensive set of disc management operations such as cataloging, copying, deleting and re-naming. You can also run programs from within MAX. Available for the BBC, B+, Master 128 and Master Compact. Please state which version is required.



*AMX DESIGN 32K ROM AND DISC £69.99

A highly sophisticated CAD package which allows the user drawings to be produced such as a simple PCB design up to the most intricate, architectural drawing.

Advanced features include full zoom and macro facilities, 58×58 screen canvas, full supported printer and plotter output. Available for the BBC, B+, Master 128 and Master Compact.



FANTASTIC AMX SOFTWARE OFFER!

The additional AMX Software range that requires the original AMX Art Rom or Super Art Rom including: 3D Zicon normal price £24.99 Database normal price £24.99 XAM normal price £24.99 MindGames normal price £14.99. Total price – £89.96 but now available as a complete package at only £69.99.

These superb products are available from all good computer dealers or direct by Cheque, Access or Visa. All prices include VAT and post and packaging.

FOR INSTANT ACCESS, VISA ORDERS TELEPHONE (0925) 413501/2/3

AMX SOFTWARE

· IMAGINATION AT YOUR FINGERTIPS ·

* ALL THESE PROGRAMS WORK WITH KEYBOARD, JOYSTICK OR MOUSE.

EDUCATION

Superart and stop press are now available under licence for ECONET levels 2 and 3.
Please apply direct for Educational Discounts.

ADVANCED MEMORY SYSTEMS LTD. 166/170 WILDERSPOOL CAUSEWAY, WARRINGTON, WA4 6QA. TELEX 628672 AMSG. FAX 0925 58039.

TUBELINK ON PRESTEL PAGE 2582182 SUPPORTS THE AMX MOUSE, AND ALL AMS SOFTWARE.

The Comms Column

■ Tubelink has found a new home. The Prestel database for BBC micro users was placed in limbo when Viewfax, its publisher, decided to quit the system. But Tubelink has now moved to Micronet. It can now be found on pages 800256 and 800258. Waveguide 258, Viewfax's media coverage section has also moved to Micronet – type *WAVEGUIDE# in order to find it.

■ Aldoda International, the company best known for its Teletel terminal software which gives access to the French Minitel network, has just released *Squeak* – a completely mouse-driven Prestel terminal. The software requires an AMX *Super Art* ROM to be fitted to the BBC micro in use, but after calling up the software, you can log on and use Prestel and other Viewdata systems via mouse, joystick, or keyboard.

Squeak boasts some very useful features including pull-down menus for tagged frames, automatic sending of pre-written off-line mailboxes, and a continually updated clock. *Squeak* is supplied as a 16k ROM and disc for £24.50. More details from Aldoda on 01-586 5686, or you can contact the company on Telecom Gold: 72:DTB10179.

■ The appeal case of Steve Gold and Robert Schifreen, the two responsible for the infamous hack into the Duke of Edinburgh's Prestel account has come before the Appeal Court in London. The two have been found not guilty of forgery. Following the media coverage of the case both men have been overwhelmed by the fame brought to them, and since the original judgement last April, they have been writing non-stop for the computer press. Steve Gold now has regular columns on both Micronet and Microlink.

Buzz

Listening micro wins

By Sam Greenhill

A device which allows disabled children to talk to their computers has won an award. Micro-Voice from R&D Speech Technology took first place in an award scheme run by Datasolve technology, designed to help cerebral palsy children.



Using Micro-Voice is a great help to disabled kids

Micro-Voice is a low-cost speech recognition system. The system can understand children with impaired speech, allowing them to play computer games or use a wordprocessor simply by speaking. The system can understand 10 words at a time.

According to Datasolve, one of the main benefits of the Micro-Voice, is that it is extremely easy to use. Usually only two repetitions of each phrase are needed for the system to become word perfect. It costs £150.

Runners up for the award were a writing aid, a keyboard adapter and a pointing device.

The *Predictive Adaptive Lexicon (PAL)*, is a system which actually predicts what the child wants to type. When the child types the first letter, the system displays a list of the most common words used, beginning with that letter, and then the user can either select a word from that list, or continue typing the word. The process is repeated until the user either selects a prediction or completes the word.

The Light Reactive Switch Tray, fits on top of a BBC keyboard, and will respond to the user waving a hand or arm over the required holes in order to block off the light, telling the system that a key has been 'pressed'. This avoids the child becoming frustrated when unable to operate a conventional keyboard accurately.



PAL aids wordprocessing

The Photonic Wand enables a cerebral palsy child to use a computer by head movement. Attached to a plastic helmet or on the side of ordinary spectacles, the Wand acts as a pointer which can control the cursor. The Wand is effectively a lightpen which can work from a long distance.

Ian Taylor, managing director of Datasolve, hoped that the awards would 'stimulate support from the computer industry for further research and development'.

Open up the Red Box

Red Three is the latest addition to the Red Box control system from General Information Systems. Red Boxes allow you to control a wide variety of ordinary household electrical appliances using your home computer via the mains circuit.

The new unit is an analogue to digital converter, and can be fitted with a range of monitors such as humidity detectors, temperature sensors or light cells. It can also control low powered devices like five-volt relays in the same way it handles mains devices.

GIS claims that Red Three is the most versatile of the Red Boxes which it has released so far, as it can be dedicated to so many different tasks. It costs slightly more than the other two, at £59.95.

ACP memory

Advanced Computer Products has now released its quarter-meg RAM cartridge for the Master and Electron.

The cartridge has 256k of memory which can be used for holding ROM software images or, using software supplied, as a RAM disc. Because this works at the machine's internal speed it's extremely fast.

The cartridge costs £79.95.

TWILLSTAR COMPUTERS LTD

WINTER CATALOGUE OUT NOW! **FREE** Phone and get your issue.

Computers



ARCHIMEDES
HIGH PERFORMANE COMPUTER SYSTEMS

Archimedes systems use the Arthur operating system, a new version of the BBC Micro operationg system. BBC BASIC is replaced by a new extended version, BBC BASIC V. The speed and power of Archimedes allows the programmer to exploit RISC architecture with a range of high level languages for scientific engineering and business uses. In addition to BBC BASIC V, Acornsoft's development languages include C, ISO-Pascal, FORTRAN, Lisp and Prolog. The Acornsoft Software Developers Toolbox provides utilities to simplify program development and debugging; while an extensive Software Developer's Debug Tool facilitates high level leanguage deelopment in C, Pascal or FORTRAN. All Archimedes Systems have a floating point emulator as standard. On the 400 series, complex mathmetical calculations can be further enhanced by the addition of a floating point unit (FPU). All machines have feature: 32 bit RISC technology – BM enhanced style keyboard with 3 button mouse – BBC Micro style operating system (Arthur) – BBC BASIC V – interfaces; printer, serial, monitor, stereo sound – ECONET plug-in option – a variety of podules can be fitted. Archimedes is an open system and its flexibility is achieved by fitting any of the following podules (peripheral modules) via a back plane: hard disk controller (300 series only) – ROM extension board – MIDI music interface – MS-DOS co-processor – SCSI – hardware floating point unit – Ethernet podule.

THE 300 SERIES Consists of two models, Archimedes 305 0.5 Mbyte of RAM and Archimedes 310 with 1 Mbyte of RAM. Both machines have a 512 Kbyte ROM and a 1 Mbyte (unformatted) 3½" disc drive.

THE 400 SERIES Offers increased expansion capabilities. The Archimedes 410 has 1 Mbyte of RAM. 1 Mbyte (unformatted) 3½" disc drive, a hardware floating point unit option, a co-processor bus, a hard disk controller, a four socket back plane, 512 Kbytes of ROM. At the top of the range is Archimedes 440. This machine possesses all the features of the 410 as standard, with the adoption of 4 Mbytes of RAM and a 20 Mbyte hard disk.

305 BASE AKB10	918.85
305 & mono monitor	976.35
305 & colour monitor	1148.85
310 BASE AKB15	1006.25
310 & mono monitor	1063.75
310 & colour monitor	1236.25
410 BASE AKB26	1608.85
410 & mono monitor	1666.35
410 & colour monitor	1838.85
440 BASE AKB20	2643.85
440 & mono monitor	2701.35
440 & colour monitor	2873.85
Archimedes/Master Econet	49.99
0.5 MB RAM	102.35
Floppy disk	143.75
20 Mbyte hard disk & podule (300 only)	573.85
Podule Backplane	40.25
ROM Podule	TBA
I/O Podule	TBA
MIDI add-on to I/O	TBA
A series reference manual	£19.95

MASTER 128

Complete With Internal Software	£399.00
Master Turbo Upgrade	£113.95
Master Econet Module	£46.00
Master ET	£349.00
Master 512 Upgrade	£217.35

The Master 512 upgrade board incorporates the Intel 80186 processor, plus 512K bytes of RAM. Digital Research DOS+, which is copatible with both MS/DOS version 2, and CP/M 86, allows you to run a large proportion of the most useful programs available. A dual 80 track disc drive is required to run programs on the 512. Provided free with 512 upgrade board are three GEM packages, GEM Desk Top, GEM Write, GEM Paint.

UNIVERSAL SECOND PROCESSOR

This allows you to connect co-processor boards designed for the Master Series to your BBC Models B or B+. Fitting a Turbo board boosts the BBC's already rapid performance to twice the speed of the standard processor. Fitting the 512 co-processor converts the BBC micro into a 16 bit machine, opening up new possibilities within the world of MS-DOS and CP/M 86. **£86.25**

Eprom Cartridge	£14.95
Reference Manual Part I	£14.95
Reference Manual Part 2	£14.95
Acorn Teletext Receiver	£108.00

FILESTORE

Filestore provides shared access to file and printer services on Econet. The filestore consists of two units – a dual 3.5 inch floppy disc unit 1.2 Mbytes of storage (Filestore EO1) which can be expanded with a high performance 20 Mbyte Winchester disk drive unit(Filestore E20).

FILESTORE EO1	£952.00
FILESTORE E20	£829.00

ECONET ACCESSORIES

100m Cable	£89.00
Station Lead Set	£29.00
Econet Starter Kit	£99.00
Econet Bridge	£199.00
Level I Fileserver 40 Track	£99.00
Level 2 Filesaver 80 Track	£235.00
Print Server Eprom	£49.00

BBC Upgrades

64K Upgrade Kit	£39.95
17/70 Upgrade Kit	£49.94
ADFS ROM	£29.95
Disc Upgrade Kit	£65.00
Econet Upgrade Kit	£49.00
DNFS ROM	£20.00

WORD PROCESSING SPECIAL PACKAGE

PACKAGE 1

Based on Master 128. The Twillstar All in One Word Processing Package contains a Master 128, View 3.0, Viewsheet, High Res Green Monitor, 800K Dual Drives with PSU, Quendata Daisy Wheel Printer together with a box of Discs, Paper, and all the Cables. **£899.00**

PACKAGE 2

Based on Master Compact 128. The Twillstar package includes Compact 128, lâtest version of the View Word processor, single 640K disk drive, monochrome monitor, correspondence quality printer. All connecting cables for above and also 5 disks and some paper. **£635.00**

BBC Master Compact

Twillstar continues to offer the MASTER COMPACT for your Home Education and Business needs! Complete with bundled software and an integral 3.5" Disk Drive in the following Systems:-

ENTRY SYSTEM **£299.00**
128K *Single 640K Drive* * bundled software*

TV SYSTEM **£325.00**
128K *Single 640K Drive* *UHF Modulator* *Bundled Software*

MONO SYSTEM **£369.00**
128K *Single 640K Drive* * Bundled Software* *12" High Res Monochrome Monitor*

COLOUR SYSTEM **£499.00**
128K *Single 640K Drive* * Bundled Software* *14" Medium Res Colour Monitor*

SPECIFICATIONS: ★ Compatible with Master Series micro subset ★ 128K RAM inc 64K sideways RAM ★ 64K ROM inc 32K MOS, 16K BASIC ★ Up to 4 internal ROM sockets ★ 3.5" 640K formatted disk drive ★ OUTPUTS: Video/RGB/Printer/ Mouse or Joystick ★ Disk drive ★ (optional) Econet ★ Serial ★ 5V power from disk drive module ★ Usual 8 BBC disply modes inc. Mode 7 ★**BUNDLED SOFTWARE**: Pull down menus * Desk top inc. note pad, calculator * VIEW 3.0 * CARD INDEX * Full LOGO * BBC BASIC 4.0 * ADFS + Utils * Welcome suite * Tutorials * (1770 DFS under licence)

2nd DRIVE KIT **£113.00**

Monitors

MONOCHROME MONITORS

Phillips BM 7502
12" hi res. P31 Green Phospher Screen. CVBS input. Audio input. Band width 20 MHz. 2000 CHRS Dispay. Adjustable viewing angle. **£79.00**

Phillips BM 7522
Amber Screen **£95.00**

Phillips BM 7542
Dedicated WD phosphor Screen monitor **£95.00**

Philips BM 7513
12" Green IBM compatible **£120.00**

TAXAN
New Taxan Monochrome Screens

Taxan KX117 12" Green Screen P31	£89.00
Taxan KX118 12" Green Screen P39	£99.00
Taxan KX119 12" PUL Amber Screen	£99.00

COLOUR MONITORS

Microvitec 1431 Std Res	£201.25
Microvitec 1451 Med Res	£255.00
Microvitec 1441 Hi Res	£391.00
Microvitec 2030 Cs 20 Std Res	£425.50
Microvitec 1431 AP Std Res	£224.25
Microvitec 1451 Ap Med Res	£293.25

PHILLIPS
New from Phillips

Phillips CM8833
14" CVBS and RGB medium resolution colour monitor. IBM PC compatible. Fast blankup to enable superimposing. Stereo Audio. Ear phone socket. 600 dots x 285 lines vertical **£269.00**

Phillips CM8852
14" RGB professional med res colour. 700 dots x 285 **£289.00**

Phillips CM8873
14" RGB high resolution colour monitor Res 850 x 480 **£550.00**

Taxan Super Vision 620

High Resolution colour monitor with several unique features, at an affordable price.

SUPERVISION 620
12" RGB High resolution colour monitor. Fully compatable with IBM, Apple, BBC and most other Personal Computers. 635 x 312 line resolution. Positive or negative sync input. Text colour switchable to green, amber, white or blue or inverse white. Super high contrast tube. Optional tilt-swivel base (with clock/calendar available). Special introductory offer. **£299.00**

NEW SUPERVISION 625
12" high resolution colour monitor. 661 dots x 312 lines **£369.00**

MONITOR TO TV CONVERTER

AV 7300 Colour tuner module Push button control. 12 preset channels. Built in aerial. Compact design. Composite video only **£69.00**

Mitsubishi 1404 Medium Resolution Monitor with 640 X 200 Pixels RGB available with IBM or BBC Leads. **£249.00**

Disc Drives

MITSUBISHI DISC DRIVES

User Friendly Disk Drives 100% BBC compatible slimline disc drives. All drives are supplied complete with formatting diskette, comprehensive users manual and all necessary cables. All drives are 40/80 Track switchable at the front and have two years warranty.

5¼" Drives without P.S.U.

MD 400A Single 400K Double Sided	£118.00
MD 802C Dual 400K Double Sided	£219.00

5¼" Drives with P.S.U.

MD 400B Single 400K Double Sided	£135.00
MD 802E Dual 400K Double Sided	£249.00

SPECIAL
MD 802D Dual 400K Drives horizontally mounted in a monitor stand to fit both the BBC B and the Master series. **£269.00**

SOURCE DISK DRIVES

Source SD35 3½" disk drive, single drive **£85.00**

Source SD352 3½" dual drive **£149.00**

Supplied cased complete with cables, powered from computer. Extended two year warranty.

Source SD35S 3½" single drive with P.S.U. **£135.00**

Source 352S 3½" dual drive with P.S.U. **£199.00**

Source SD3545S Combo dual 5¼" and 3½" drives with P.S.U. **£249.00**

Winchester Disk Drives

WINCHESTER DISK DRIVES

Source HD20 Twillstar's 20 Mbyte winchester drive including Acorn DFS ROM complete with P.S.U. **£599.00**

Source HDP201 Twillstar's 20 Mbyte winchester drive and a 400k double sided floppy drive built in a plynth to accomodate monitor on the top and the computer underneath. Includes ADFS ROM and P.S.U. **£869.00**

Source TS10 10 Mbyte tape streamer backup unit with utilities £695.00

Othe size hard disks are available, please call for our latest prises.

Accessories

Taxan KIF 4308 buffer compatible with any Centronics interface printer **£149.00**
Further 64k upgrade available.

Printer/Computer sharers.

2 – 1	£39.00
6 – 1	£79.00

Serial and Parallel T Switches

Parallel T switch	£67.85
Serial T switch	£67.82

FLOPPY DISKS

Raven 5¼" pack of 10 in a clear library box **£15.00**

Raven 5¼" rainbow colour pack of 10 in library box **£17.00**

Raven 3½" single sided pack of 10 in library box **£18.00**

Raven 3½" double sided pack of 10 in library box **£25.00**

LOCKABLE STORAGE BOXES

Trackmaster 5¼" 70 x 5¼" lockable	£7.95
Trackmaster 5¼" 100 x 5¼" lockable	£9.95
Trackmaster 3½" 40 x 3½" lockable	£6.95
Trackmaster 3½" 100 x 3½" lockable	£9.95

YOUR ONE STOP MEGA-COMPUSTORE FOR HOME, EDUCATION & BUSINESS NEEDS!

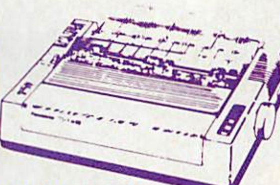


SPECIAL OFFER

SAVE £29.00

FREE PRINTER STAND
FREE BBC CABLE
200 SHEETS OF PAPAER

When you buy a Panasonic KX-P1081 The faster and enhanced KX-P1081. 120 cps in draft mode. 24 cps in NLQ mode. Fully Epson RX80 and IBM Matrix and Graphics Printers compatible. Standard friction and tractor feed. Operator accesible print mode switch. Standard 8 bit parallel interface. RS232 interface is optional **£179.00**



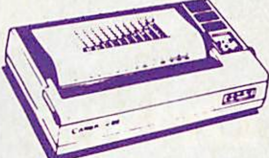
Juki 5510
- Gives you 180 CPS & NLQ Standards **£269.00**
Compatibile with both the Epson and the IBM Graphic Printer). Standard 2K memory (expandable to 14K) built-in Parallel Centronics interface and 8-switch international character sets.
If you need colour too, the optional Juki 5510 Colour Kit gives you seven colours. **£112.00**

EPSON PRINTERS
Epson FX 800 and FX 1000 range offers superior printing and technical features. 200 cps in draft and 40 cps in NLQ. Complete with tractor and friction feed as standard. Offering IBM compatibility, full graphics. Also includes two NLQ fonts, 10,12,17 and 20 cpi, double height and double width with 8K buffer built in.

FX 800	£369.00
FX 1000	£499.00
FX 800 Sheetfeeder	£141.00
FX 1000 Sheetfeeder	£163.00

Epson EX 800/1000 High speed printers. 300 cps in 12 cpi mode. Also offers four colour printing.

EX 800	£465.00
EX 1000	£626.75
Colour option for both	£62.00



JUST RELEASED
Epson LX 800
120 cps Epson & IBM comaptible. Near letter quality. Standard centronics interface complete with tractor feed **£229.00**

Epson LQ 800	£499.00
Epson LQ 1000	£669.00

CREDIT FACILITIES
Full credit facilities now available nationwide
* LOW DEPOSITS
* FAST FRIENDLY SERVICE
* UP TO 3 YEARS TO PAY

Call for further details
Typical APR 36.3%

CANON PW1080A
80 column printer with 160 cps draft and 40 cps NLQ with built in friction and tractor feed. Fully compatible with Epson FX80. Standard parallel interface. **£249.00**

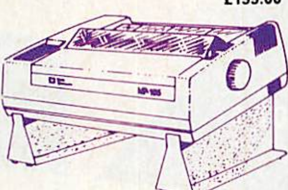
CANON 55A
Wide version. Fully IBM compatible. **£399.00**

STAR NL-10
Fine Near-Letter-Quality, 100% compatibility and total reliability all in one easy to use printer **£229.00**

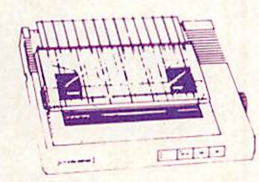
STAR NX-15
Same as Star NL-10 but with 136 column width. Both Epson and IBM compatible **£399.00**

MP200
200 cps in draft. 40 cps in NLQ mode. 7K buffer as standard (128 down-loadable characters in NLQ) optional 8K memory. IC font cards. **£274.85**

MICRO P MP165
80 Columns. 165 cps in draft mode. 35 cps in NLQ mode. Ultra high resolution graphics. Friction and traction feed. 2 Year warranty. Epson or IBM compatible control codes. **£199.00**



MP201
Same as MP200 with 136 columns **£318.55**



MP135
Just released
135 cps, 80 column printer. Frictio/ tractor feed. NLQ. Epson & IBM Compatible **£145.00**

MP480
New
Fast reliable 480 cps dot matrix printer. 74 cps, NLQ, 80 column, fully Epson & IBM compatible, Std parallel **£349.00**

TAXAN KXP815
Taxan KXP 815 New enhanced KP 810 with 160 cps and fully Epson & IBM Compatible **£299.00**

TAXAN KXP915
Taxan KXP 915 New enhanced KP 915 with 180 cps and fully Epson & IBM Compatible **£420.00**

CITIZEN MSP10E
160 CPS Draft and 40 CPS NLQ. With two years warranty **£269.00**

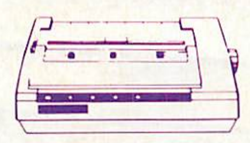
CITIZEN MSP-15E
17" wide carriage. 136 column operating at 160 CPS and at the flick of a switch will print near letter quality at 40 CPS. Fully Epson and IBM compatible. 8k of standard buffer built in. Standard Centronics are optional RS232 **£379.00**

CITIZEN 120D
Bringing to the small business, educational adn hone user good quality and attention to detail. Its compact size, host of standard features and built in quality and reliability that supports Citizens unique full 2 year warranty make it a must for all computer users. Fast draft output: 120 cps. Built-in NLQ: 25 cps. IBM and Epson compatible. Plug-in interface cartridge. Tractor and friction feed as standard. Optional cut sheet feeder. **£179.00**

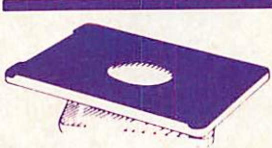
CITIZEN LASER OVERTURE 110
Overture 110 Prints 10 pages per minute. COmes complete with internal controller with print resolution of 300 x 300 dots per inch. Print capability of Standard Text, IBM & Epson bit-map graphics, IBM graphic character set, Epson graphic character set. Resident fonts are: Citizen Pica upright/italic, Citizen Elite upright/italic, Citizen Courier, Citizen Bookface (over 56 typefaces), downloadable one character set in Epson Mode. 11 international character sets. Standard Centronics Parallel and Serial RS232C. Standard 512K memory 384-byte user available. Fully compatible with Epson FX1000 IBM Proprinter & Diablo 630. **£1850.00**

SOURCE
The Complete Solution

TECO VP1814



Dot matrix printer. The VP1814 is fast highly reliable and easy to operate.
★ Standard 80 column
★ The high-speed, low energy consumption 9 wire dot head gives printing speed of 189 cps and NLQ speed 36 cps
★ Bi-directional, logic seeking in text mode
★ Fan-fold, roll or cut-sheet paper is possible with adjustable sproket pin feed and friction feed
★ Offers: emphasized, double print, super script, sub script
★ Justified print modes are also available including left, centre, right and full justification
★ 9 graphic modes are available
★ Both download and inprint buffer can exist simultaneously
★ 7K input buffer standard can be expanded to 15K
★ Printing modes selectable at front panel (NLQ/draft, Pica/Elite, enlarge, emphasize, condense, italic
★ 11 Language international character font is internalized
★ Both IBM and Epson compatable
MAIN UK DISTRIBUTOR **£229.00**

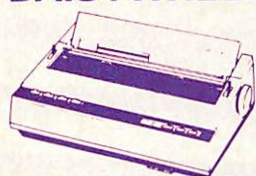


SWIVEL BASE OFFER
Special summer price Tilt and swivel base for 12" or 14" monitor or TV. "Looks very elegant" at an ubeatable price. **£9.95**



PRINTER STAND
Fits nearly any width of printer. Allows paper storage and gives ideal viewing position. Can also be used for computers and monitors. Steel construction prevents bending or buckling **£18.00**

DAISYWHEEL



PANASONIC KX-P3131
A Fully Formed Serial Impact Daisywheel printer with print speed of 17cps. Diablo compatible print wheels. Print pitches are: 10, 12, 15 and proportional spacing. Standard friction feed and optional tractor. Paper width 13.5 inches. Standard Centronics optional RS-232C. Built with 6K text buffer expandable to 32K buffer. **£289.00**

BROTHER HR 20
The new Brother Daisywheel HR 20 8K standard buffer upgradable to 16k. Comes standard with serial and parallel port **£389.00**

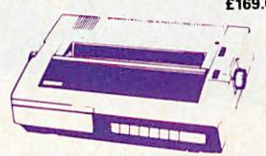
JUKI Daisywheel
Juki 6100 **£329.00**

NEW MP26 Daisywheel
MP26 A feature rich very quiet printer. Universal compatibility with almost al personal computers at an unbeatable price. Speed: 26 cps. 132 columns Diablo 630 compatible **£249.00**

Optional Tractorfeed	£95.00
Optional Sheet feeder	£145.00

MP40
A very fast, quiet printer with features and compaible with virtually all computers at a fantastic price. 40 cps, 132 column, diablo 630 interfacew, parallel interface, built in standard RS232 optional **£355.00**

GAKKEN GPR-2000
Print speed of 18 characters per second. Fully Qume compatible. Takes Qume exchangable Daisywheel and ribbons. Selectable 10,12 & 15 pitch. Supports proportional spacing. Standard friction feed. Tractor/cut sheet feeder and serial interface optional. **£169.00**



How to Order

You can purchase any of the items listed. All you have to do is write your requirements on a sheet of paper, and we will despatch your goods within 24 hours, subject to availability. Please add the following amounts for Postage and Packing.

Items below £10.00	add **£1.50**
Items below £50.00	add **£2.50**
Items below £100.00	add **£3.50**
Items over £100.00	add **£8.00**

(UK Mainland only)
All prices include VAT at 15%
'No Hidden Extras'
Prices correct at time of going to press but subject to change without notice.
Please make cheques payable to:
TWILLSTAR COMPUTERS LTD.
Access/Visa Card Holders: Welcome. Call now on:-
01-571 5938 or 574 5271

TWILLSTAR COMPUTERS LTD

SOUTHALL B.R
SOUTH ROAD
HAYES
WESTERN RD
HAYES RD
MONTAGUE WAY
THE COMMON
POST OFFICE
BLANDFORD ROAD
NORWOOD ROAD
UNION
POLICE STATION
TWILLSTAR
CANAL
JUNCTION 3
M4
LONDON
HEATHROW
HESTON RD

APEX HOUSE
BLANDFORD ROAD
NORWOOD GREEN
SOUTHALL
MIDD UB2 4HD
☎ 01-574 5271 or
☎ 01-571 5938
Telex: 25247 Telex G.attn TIL
Fax: 01-547 4326


HD 2000
£609
MD802 F
£174
COMBO C
£235
UFD 2000
£782
ALL PRICES EXCLUDING VAT
BBC Compatible Disc Drives
COMBO C – 3.½" plus 5.¼" combination drive in 802C case without PSU
MD802F – Dual 800K drive 3.½" 40/80 track switchable
HD2000 – 20MB Winchester built into MD802E case with independent PSU Using ADFS including Winchester controller card and BBC host adaptor card
UFD2000 – 20MB Winchester and IBM floppy disk drive 40/80 track switchable housed in MD802DM case
AKHTER
AKHTER GROUP PLC.
TELEX 818894 AKHTER G
AKHTER HOUSE, PERRY ROAD, HARLOW, ESSEX CM18 7PN, UK
TEL: HARLOW (0279) 443521
Dealer Enquiries Welcome

Outcry over Gold prices

By Steve Mansfield

Telecom Gold is facing accusations of abusing its power following changes in its pricing structure which could result in massive increases.

A £5 a month subscription fee has been slapped on 'club' accounts, the type of account most commonly used by individuals. Simultaneously time charges have been reduced, from 11p to 6.5p a minute at peak time. But BT has imposed a data charge based on the amount of text you send and receive, measured in 512-character chunks.

This means the more efficient users, who have high speed modems to reduce time charges, will benefit less. The cost of a typical mail session could rise by as much as 200 or 300 per cent.

Telecom Gold is the most popular electronic mail service, and some users feel that BT is exploiting its position in forcing price rises on its existing customers.

For the moment, Microlink, which is run by Database, and Interlink, run by Micronet, will be unaffected. Microlink already imposes a £3 a month subscription, while Interlink is free apart from time and storage charges.

Dutch dates

Holland's biggest event for the BBC micro user will take place on October 10. The Big Ben Club, based in Nieuw Vennep, is organising its annual exhibition which will show the new Archimedes machines, as well as having education, communication and genealogy activities. The Big Ben Club is the largest Acorn user group outside the UK. Admission is free for club members, and £2.50 for non-members.

BBC graphics fit for TV

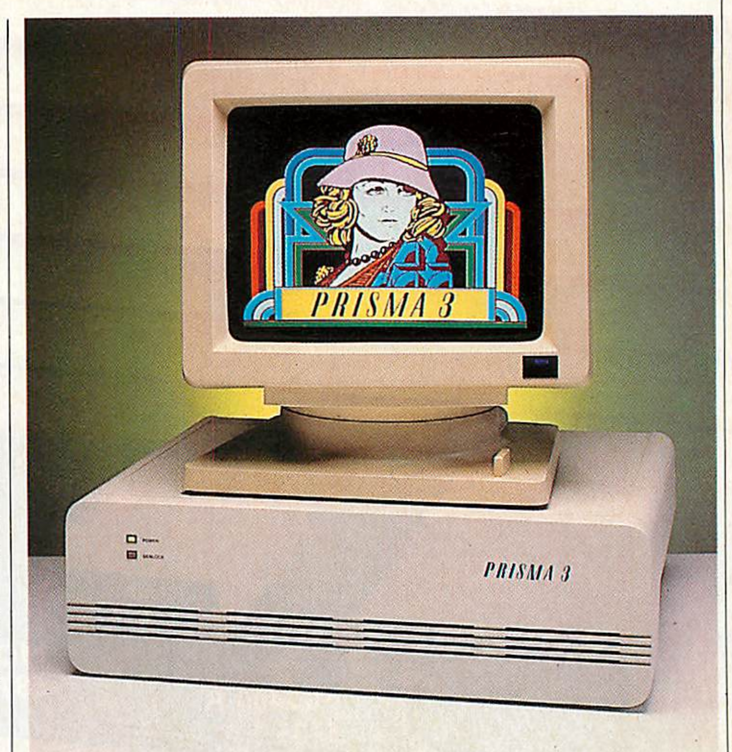
Television-quality graphics and animation are now possible on a BBC micro using Millipede's latest hardware system.

Launched at the *Acorn User* Show, the Prisma-3 is capable of producing resolutions of up to 1536 by 574 pixels, using 256 colours on screen from a palette of nearly 17 million. It can do all this extremely fast at up to 900,000 pixels a second.

The hardware provides facilities normally handled by software, including zooming and panning. You can define windows for animation at a frame rate of 50 a second.

The Prisma-3 can hold four full screens in memory, and frame grabbing is available from cameras, tape or disc.

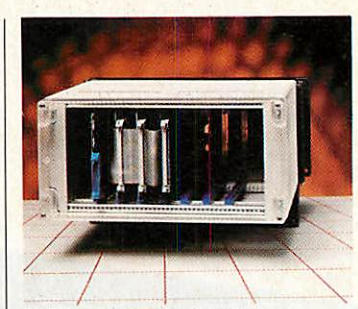
The £3740 system is controlled by a BBC B or Master.



Prisma-3: superb graphics at a price

More powerful control

Cambridge Microprocessor Systems has extended its control and monitoring systems. The processors, which use BBC Basic, now have multi-tasking and colour video output. Networking has also been added. The systems can be linked to BBC micros for software development and monitoring.


CMS's new control system

Technical Logo grows

Extensions to the recently launched Technical Logo software should make it one of the most versatile control languages around, claims its manufacturer, Logosoft.

The new software package enables the language to work with the seven most popular interface units used in schools. A single disc contains all of the different versions of the language extension which can then be selected from the menu.

The extension pack costs £20, or £45 if you want it with the Master Logo package.

Meanwhile, Logosoft is at pains to point out that it is not connected with Lego, and that Logosoft's products are not replacements for Lego's own control software. The confusion originally arose because Technical Logo works with the Lego interface unit.

News in brief

■ The *Wordpro* utility package for *Wordwise* users has been improved and had its price cut. The disc-based package now allows 80-column previewing of text regardless of the size of the files. It also allows you to preview multiple files. The price has come down from £23 to £15.95. Low price, and in some cases free, upgrades are available for existing owners. Ring Softec on (0202) 476415.

■ A conference for network users, Econet 87, is being held at Leicester University from September 30 to October 1. There is space for up to 300 participants, and the programme will include talks, workshops and practical help. More information on (0386) 792008.

■ Brilliant Computing is looking for BBC micro programmers to produce graphics to be used by the severely disabled people. Contact Brilliant on (0274) 632223.


MD802 E
£261
MD400 F
£87
MD400 B
£135
MD802 DM
£282
ALL PRICES EXCLUDING VAT
BBC Compatible Disc Drives
MD400B – Single 400K drive 40/80 track switchable, Double Sided, with PSU
MD400F – 3.½" Single 400K drive, Double Sided
MD802E – Dual 800K drive, 40/80 track switchable, vertically stacked, with PSU
MD802DM – Dual 800K drive 40/80 track switchable, horizontally mounted in Monitor Stand, with PSU
AKHTER
AKHTER GROUP PLC.
TELEX 818894 AKHTER G
AKHTER HOUSE, PERRY ROAD, HARLOW, ESSEX CM18 7PN, UK
TEL: HARLOW (0279) 443521
Dealer Enquiries Welcome

News in brief

■ Micronet users hooked on the *Shades* multi-user game are getting some financial help for their habit. All 'Shadists', as Micronet insists on calling them, are getting five hours of play at absolutely no cost whatever.

This can be spread over as many sessions as you like, and can be divided between the two personae that each player is allowed. The offer is open to all Micronet members, whether they've played before or not.

■ The first new programming language for the Archimedes has come, not from Acorn, but from a company called Smalltalk Express – and it's free.

Smalltalk is used by software engineers for prototyping business and commercial systems, but mostly on large and expensive machines. Little Smalltalk is an entry-level version of the software which works on the Archimedes, IBM-compatible PCs and the Apple Macintosh.

The software is being supplied free with a book by Tim Budd on the language. The book costs £29.95.

■ Two software packages from BBC Enterprises have been drastically reduced in price. The two ROM-based products are the *Ultracalc 2* spreadsheet and the *Monitor* memory and disc editor. *Ultracalc 2* has been reduced by nearly £50 to £29.95, and *Monitor* by £20 to £19.95. Both are compatible with all BBC micros.

■ Granada Microcare is offering a support service for the Domesday system. The company will provide a nationwide field service and workshop support for the AIV system.

■ The Potteries' BBC user group, Potbug, is now selling its newsletter to anyone who's interested for 40p. It contains material for both the BBC micro and the Electron. The minimag comes out roughly once a month, and its contents include listings and reviews.

Government plans blitz on software pirates

By Bill Penfold

Computer pirates are facing tougher penalties under new legislation being put through Parliament this autumn.

Maximum fines are to be increased, and in extreme cases prison sentences of more than two years may be on the way.

It's all part of the Government's decision to start sorting out the confusion over Britain's copyright laws.

Reforming the law on intellectual property is to be one of the planks of the Government's post-election programme. . . and a plank the software pirates will have to walk.

Confirmation came in the Queen's Speech setting out the Government's agenda, which included a specific commitment to a new Copyright Bill.

Ministers freely admit the statute books have failed to keep pace with computer development despite the Copyright (Computer Software) Amendment Act which came into force just over two years ago.

The 1985 Act aimed at making it clear that computer programs enjoy copyright protection, and it also beefed up the criminal remedies against piracy.

In addition it cleared up the anomaly in the law which ruled that works written on paper were covered by copyright protection, but not if typed directly into a computer keyboard.

There are still legal doubts over works created in what Whitehall calls 'non-human readable form on media other than computer memories', but which are intended ultimately for loading into a computer.

That will be cleared up by the 1988 Act. So too will another grey area – the loophole some software pirates believe they can exploit. This uncertainty surrounds copying software when it does not directly involve the computer – for instance, copying computer cassettes on twin-deck audio recorders.

One area of interest to non-disc users is the Government's plan to slap a special 10 per cent levy on to blank cassette tapes. This is to 'legalise' the home taping of records – the money from the levy being distributed to the music industry.

But there is no need for Beeb cassette users to rush out and stock up before the levy is introduced. The extra 10 per cent will only apply to tapes lasting for 35 minutes and over.

The bill will be introduced mid-November and the aim of Trade and Industry Minister John Butcher is to get it into force by early next summer.

Art package for schools

Advanced Memory Systems claims to have produced 'the most comprehensive drawing package yet available for the BBC micro'.

AMX Design comes on a 32k chip plus a disc, and can be controlled by mouse, joystick or keyboard. It uses mode 0 for maximum resolution, although that limits it to just two colours on the screen at any one time.

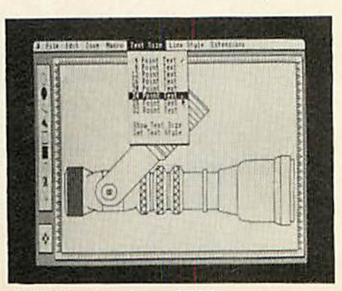
The program provides drawing tools like ellipses, circles, arcs and boxes. You can also zoom in on areas of your picture that need touching up. The software includes one unusual feature, allowing you to produce multi-level drawing plans. The program can dump drawings to Epson-compatible printers, as well as Penman and Plotmate plotters.

AMX Design is aimed mainly at schools and colleges. It's not compatible with the Archimedes yet, but AMS will be bringing out similar software for that machine in the near future.

The price is £69.99, with discounts available for bulk educational purchases.

AMS has had a busy time recently, having been involved in a dispute over the name 'Pagemaker'. An American corporation, Aldus, has claimed rights to the name for its desktop publishing package, which runs on the Apple Mac and IBM PC-compatible micros.

The companies have reached an 'amicable' agreement and AMS is changing the name of its product to *Stop Press*.



***AMX Design* from AMS**

Blunderbox

There was a minor mistake in the August issue. Line 120 in First Byte listing 3 should have read:

```
120 PRINT "Result is: ";?first
```

You should find it now works.


STREAMER 10
£652
MD400 A
£122
MD802 C
£235
NUCLEUS 20
£1300
ALL PRICES EXCLUDING VAT
BBC Compatible Disc Drives
MD802C – Dual 800K drive 40/80 track switchable, Double Sided
MD400A – Single 400K drive 40/80 track switchable, Double Sided
STREAMER 10 – 10MB Stand alone Tape Streamer
NUCLEUS 20 – 20MB Winchester, 10MB Tape Streamer and 1MB floppy disk drive 40/80 track switchable built into a Monitor Stand, with PSU
AKHTER
AKHTER GROUP PLC.
TELEX 818894 AKHTER G
AKHTER HOUSE, PERRY ROAD, HARLOW, ESSEX CM18 7PN, UK
TEL: HARLOW (0279) 443521
Dealer Enquiries Welcome

Contacts

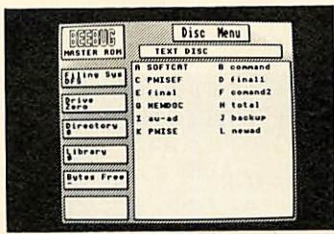
Acorn, Cambridge Technopark, 645 Newmarket Road, Cambridge CB5 8PD. Tel: (0223) 214411.
Advanced Computer Products, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ. Tel: (0276) 76545.
Advanced Memory Systems, 166/170 Wilderspool Causeway, Warrington WA4 6QA. Tel: (0925) 413501/2/3.
BBC Soft, BBC Enterprises, 80 Wood Lane, London W12 0TT. Tel: 01-576 0548.
Beebug, Dolphin Place, Holywell Hill, St Albans, Herts AL1 1EX. Tel: (0727) 40303.
Cambridge Microprocessor Systems, Brookfield Business Centre, Twentypence Road, Cottenham, Cambridge CB4 4PS. Tel: (0954) 51122.
Datasolve, Wellington House, 61-73 Staines Road, West Sunbury-on-Thames, Middlesex TW16 7AH. Tel: (0932) 785566.
Craig Evenson, 4 Duchy Crescent, Heaton, Bradford, West Yorkshire BD9 5NJ. Tel: (0274) 41156.
General Information Systems, Croxton Park, Croxton, Cambs PE19 4SY. Tel: (0480) 87464.
Granada Microcare, PO Box 60, Gatehouse Road, Aylesbury, Bucks HP19 3DU. Tel: (0296) 84321.
Millipede Electronic Graphics, 12 Pryor Close, Milton, Cambridge CB4 4BU. Tel: (0223) 862066.
Potbug, 86 First Avenue, Kidsgrove, Stoke-on-Trent ST7 1DW. Tel: (0782) 774220.
Research Machines, Mill Street, Oxford OX2 0BW. Tel: (0865) 249866.
Smalltalk Express, Hyde House, The Hyde, Edgware Road, London NW9 6LA. Tel: 01-200 0220.

C for BBCs launched

After years of going without, BBC micro owners can now use programs with one of the world's trendiest programming languages – C. And like buses, not one but two have arrived at the same time.

C is fast becoming one of the most popular languages, mainly for its portability. A C program written on one machine will work with only minor alterations on another.

Acornsoft and Beebug have both brought out C packages. They conform to the most widely recognised standard, but with some machine specific extensions. The Acorn product is unusual in that it works on everything but the BBC B. It needs either a second processor or a machine with four sideways RAM banks. The software comes on disc – both 3.5-inch ADFS and 5.25-inch DFS in the same package – at a cost of £114.



***Master* ROM from Beebug**

The Beebug C has an option to use a stand-alone generator – which will be coming out later – to produce machine code programs that will run on machines without C installed. It comes as two ROMs plus a library disc for £59.

Also new is *Termulator* for the Master, from Acorn, and the *Master* ROM which is finally available from Beebug.

Termulator is a terminal emulation program which will turn the Master into one of a range of mainframe terminals.

The *Master* ROM includes a front end program, ADFS utilities, RAM disc and a diary. It will work on the BBC B or B+ if you have ADFS and sideways RAM. The price is £39.

Autodialler for schools modem

A communications software package has just been released, for use with the Dacom DSL 2123 AD 'Schools' modem.

The software is an autodialler, and works in conjunction with the *Commstar* ROM. The software can dial a number, and keep dialling until a connection is made, claims its writer Craig Evenson. When it gets through the program can then also set up the correct protocols and enters chat mode. It costs £12 on disc.

Next month in Acorn User

Your chance to win an Archimedes in our challenging competition. Plus:

Joe Telford sorts out sorting, Terry Morris describes Weatherfax, weather charts broadcast over the radio and Chris Drage and Nick Evans try to weave medieval adventure software into the curriculum.

Tessie Revivis has been studying the Archimedes' Basic 5 and Peter Julian introduces control and robotics.

POST A PROBLEM

Acorn User has a guaranteed fast reply service for enquiries. Your answer will be returned within 10 working days for just £3 (includes VAT), or your money back.

Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £3. If you want recorded delivery add the cost of this on. Include as much detail as possible, and a disc or cassette if a program is involved, with enough space to record any corrected listing.

Please note: debugging readers' programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

We will then answer the problem and return all material received – within a guaranteed 10 working days from receipt. If we fail to match this promise then your cheque or postal order will be returned with the answered question – you can't lose!

ACORN USER READER SERVICE
141-143 Drury Lane, London WC2B 5TF

NAME ______________________

ADDRESS ______________________

____

____

POSTCODE ______________________

DAYTIME PHONE NUMBER ______________________

I enclose a cheque/postal order for £3 and an sae with my problem.

OFFICE USE ONLY Date in:
Date out:
Answered by:

AT LAST The DEMON II IS LAUNCHED

From DATAPHONE LTD.



AUTO BAUD
for ONLY £79.95 + VAT

AUTO DIAL | **AUTO ANSWER**



* V21 & V23 Speeds
* Front Panel MAINS SWITCH
* 3 Metre Telephone Lead
* Built In Power Supply

* 25 Pin D Socket
* 6 LED Indicators
* Custom Moulded Case
* Fitted Mains Plug



Introductory Offer

FREE Disc Connect
FREE Computer Lead

DISC – CONNECT

The easiest way to use a modem from a BBC

For just £5.00 + VAT

* 300 Number store with FULL LOGON SEQUENCE
* Displays details of *speed*, *hours* of operation
* Easy Number selection by cursor, code or joystick
* Works in conjunction with most comms Roms
* Auto dials voice and data lines
* Fully automatic modem baud rates on Demon
* Auto redial of engaged Data numbers
* Call timing

To: DATAPHONE LTD, 22 Alfric Square, Woodston, Peterborough, PE2 OJP, Telephone (0733) 230240.

Please send me:

			inc. VAT & P&P
......(Qty) DEMON II Modems @	£96.54	......(Qty) DEMON Modems @	£73.50
......(Qty) Magic Modems (STD) @	£91.00	......(Qty) Enterprise 1 Modem @	£119.54
......(Qty) Disc-Connect @	£6.50	......(Qty) Z Rom @	£24.00

Please enclose cheque or Access/Barclaycard No to the value of £.....and include full address.

INTERACTIVE 3D

INTERACTIVE 3D is a unique program that actually allows you to create a design directly in a 3D view. And you can zoom, rotate and change view at any time to visualise the effect of design changes. Full editing facilities allow you to create and delete points and lines, and adjust their positions in any direction, all under cursor control without having to enter any numerical data. Circles can be generated automatically and symmetrical forms can be created by reflections. Designs can be saved to tape/disc and reloaded. Views shown on the screen can be saved or printed. Altogether, nearly 50 operations are included.
For BBC B, B+ and MASTER series.

* Acclaimed in reviews (Micro User, Beebug, A&B etc)
* Widely used in schools, colleges and industry
* Licenced to Education Authorities
* Sold in nearly 20 different countries worldwide
* Probably the most powerful 3D CAD system for any home micro, and at an unbelievably low price

£8.95 cassette £12.95 disc (state 40 or 80 track)



Cheque/PO to: DESIGN DYNAMICS[A]
8 Meadow Way,
Ampthill,
Bedford MK45 2QX

MODE-ØØ DUMP

640 X 512

RESOLUTION BREAKTHROUGH!

The BBC computers have quite high resolution graphics. The maximum horizontal resolution of 640 is good but the overall effect is spoilt by the mediocre vertical resolution of 256, even in MODE O. The same limitation applies to normal screen dumps, so the only way to obtain smooth curves has been an expensive plotter.
Nothing can be done about the screen resolution, but now our unique software, MODE-ØØ DUMP, provides a means of outputting graphics to a dot-matrix printer at an amazing 640 x 512 resolution. All you have to do is add two simple *SPOOL statements to your BASIC or machine code program. All the VDU data used to plot the picture are then saved to disc for use later by MODE-ØØ DUMP. Your program can run in any MODE - even MODE 7! (although then you won't see the results until you run MODE-ØØ DUMP). The dump is in one colour (i.e. as MODE O) and covers most of an A4 page.
A useful graph plotting program is included as an example to show you how to add the *SPOOL statements to your own programs.
MODE-ØØ DUMP for BBC B, B+ and Master computers on 5¼" disc.

£12.95 disc only (state 40 or 80 track)

Please note: MODE-ØØ DUMP works with most dot-matrix printers, but if ESC"*" is not available (check your printer manual) then you have to omit from the dump 6% of the screen height (either top or bottom).

SPECIAL OFFER: (40 or 80 track disc only)
INTERACTIVE 3D + MODE-ØØ DUMP £20.00
ECONET prices on application with S.A.E.
You can save INTERACTIVE 3D pictures to use with MODE-ØØ DUMP

Spitfire 40

OUT NOW ON BBC B DISC AND ON TAPE FOR BBC B/ELECTRON SPECIAL EXTENDED MASTER/ MASTER COMPACT VERSION

CHOCKS AWAY!

THE BEST THING SINCE THE REAL THING

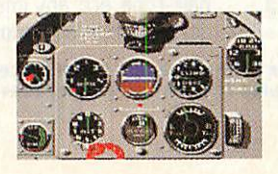
A Spitfire flight simulation set in 1940. Ground features and realistic air combat.



Target: To rise through the ranks of the RAF elite to Group Captain, VC, DSO, DFC.

Spitfire'40 also available for Commodore 64, Amstrad, Spectrum 48K + MSX.



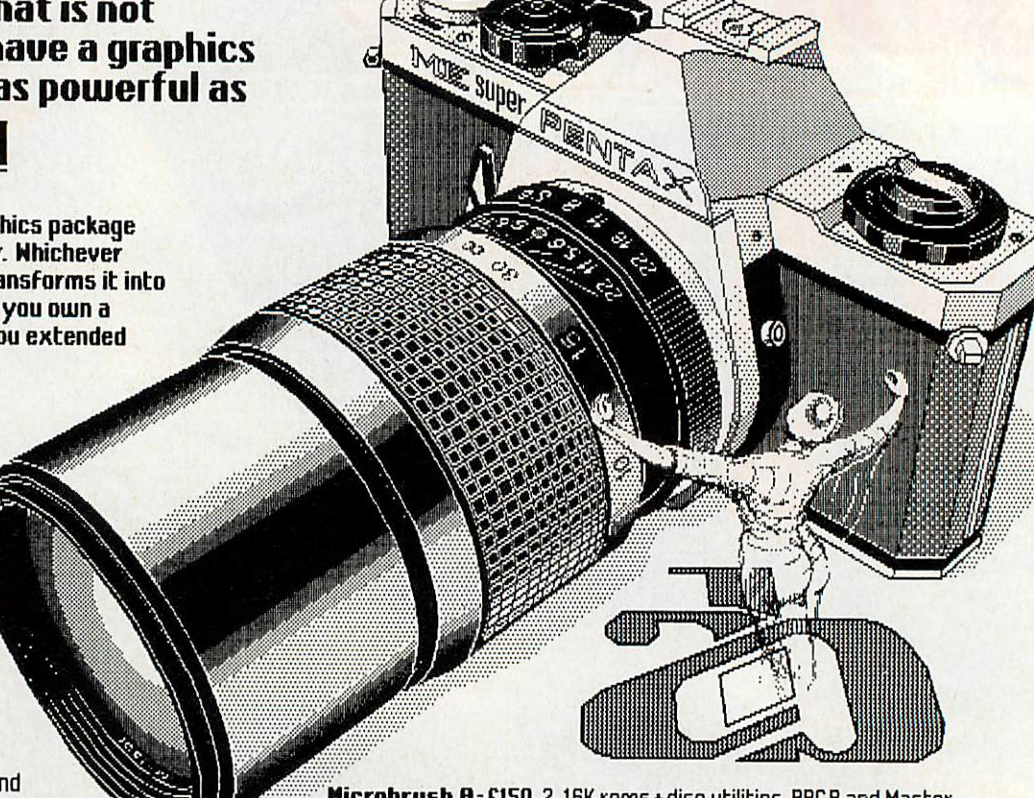


Mail order and catalogue requests to:
Mirrorsoft Ltd., Athene House, 66-73 Shoe Lane, London EC4P 4AB.
Tel: 01-377 4645.
Trade orders to:
Mirrorsoft Ltd., Purnell Book Centre, Paulton, Bristol BS18 5LQ.

Could you produce this advertisement on your Micro?

There is very little that is not possible when you have a graphics system as fast and as powerful as

MICROBRUSH



Microbrush is a professional graphics package for either the BBC B or the Master. Whichever machine you have, Microbrush transforms it into a powerful graphics computer. If you own a Master then Microbrush offers you extended resolution in mode 0 and mode 1.

Mode 0 - 1216 * 416
Mode 1 - 608 * 416

This whole A4 page was composed as one mode 0 high resolution image using the out-board scroll system, and has a resolution of 1216 * 900 pixels.

Microbrush for the BBC B is comprised of two 16K roms. The Master version contains a third rom. The first two roms can be used in either machine.

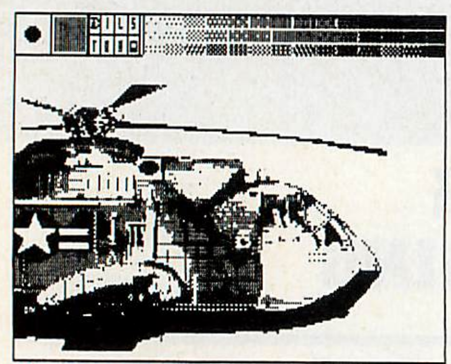
The whole system is menu driven and controlled by the Marconi RB2 tracker ball for speed and precision, but may also be used with either the AMX or the Whigmore mouse. Please note that the tracker ball is not included.

Microbrush A - £150 2, 16K roms + disc utilities, BBC B and Master
Microbrush B - £200 3, 16K roms + disc utilities, Master only.

When ordering please remember to state which system you require, whether you need 40 or 80 track discs and a telephone no. if you have one. Orders and information requests should be sent to- AB Designs, 81 Sutton Common Road, Sutton, Surrey. Phone 01 644 6643

The Painting system

This is just 1 of 33 major graphic systems contained within Microbrush and offers you 42 colours in mode 1 and 42 grey tones in mode 0. New colour palettes can be created with which you can draw lines, sketch, fill, paint in foreground, background, opaque, transparent and combined colour. Add this to a colour rubber which will selectively erase any actual colour and you have a very powerful painting system with more than **1,000,000** possible colours.



Above the painting system in mode 0.

The Ikon Generator

The ikon generator is the main workhorse of the Microbrush system as it is used for both generating and positioning any ikon up to 6 * 3 character blocks. This system is also used by the typesetter and for creating colour palettes, rubbers, paint-brushes and type-faces. Up to 46 ikons can be stored in memory. The scope of the ikon facility is immense as it allows you to transform the Microbrush system into a purpose built design tool that suits your needs.

The Type Setter

With the Microbrush system you will receive 50 proportionally spaced typefaces. The smallest allows you up to 170 characters to the line and if this is not enough then you can design your own typefaces.

The typesetter displays the current font as a scrollable menu allowing you to quickly produce professional typography.

The Screen Editor and the Special Effects Generator

The screen editor is a powerful drag system that allows you to store up to a quarter of the screen in memory. Once stored, images can literally be dragged across the screen, repeated, copied, saved to disc or fed to the special effects generator.

The Special Effects Generator

This is a very versatile system which will automatically outline, inline, shadow, 3D, half-tone, etc. any image held within the screen editor's memory.

The Injector rom

The Injector rom is the second rom in the Microbrush system. This rom contains the drawing functions such as lines, rectangles, circles, ellipses, arcs, rotate, squash, stretch, zoom, halve and quarter screens, plus a whole host of other functions.

This is a very brief description of just 7 of the 33 graphics systems contained within Microbrush. All of the systems are both fast and easy to access. Microbrush also includes a 7 * 7 character pixel editor and an Epson FX80 screen dump.

The Master rom

The Master rom takes you into a completely different world of graphics with almost 4 times the resolution in modes 1 and 0, plus 2 on-board graphics screens, 10 rom based typefaces and a 3D generator which is linked to a 10 point perspective system. This allows you to deal with exceptionally *complex* perspective tasks such as the camera seen above. Also available for the Master rom is an out-board scroll system which allows you to build images with a resolution greater than 1216 * 2000, plus there are high res. screen dumps for both Epson and Integrex printers.

Lastly flick through the pages of this magazine and see how many of the other graphic systems are capable of producing their own advertising.

Extentions to the Microbrush system include - The out-board scroll system - £40, an extended Master rom offering you 14 colours in mode 1 and 4 colours in mode 0 - £85, a typeface editor plus fifteen extra typefaces - £25, the Master rom - £65. No VAT if purchased before September 1.

Computers by Post

LOWEST U.K. PRICES GUARANTEED



PRINTER RIBBONS

		2+	5+	12+
ACORN	AP80	£2.70	£2.20	£2.00
	AP100	£2.70	£2.20	£2.00
AMSTRAD	DMP1	£3.90	£3.30	£3.10
	DMP2000/3000	£4.40	£4.10	£4.00
	PCW8256/8512	£4.30	£4.00	£3.80
BROTHER	HR5	£3.00	£2.80	£2.60
	HR15 Corr	£2.90	£2.50	£2.30
	HR15 FAB	£3.30	£2.90	£2.60
	HR15 MS	£3.20	£2.80	£2.50
	HR15 also for HR25/HR35			
	EP44	£2.90	£2.50	£2.30
	M1009	£3.40	£2.90	£2.70
CANON	PW1080A Black	£3.10	£2.60	£2.40
	PW1080A Red or Blue	£4.50	£4.10	£3.80
	PJ1080 Ink Jet Colour. One Off			£10.90
	PJ1080 Ink Jet Black. One Off			£8.90
CBM	1515	£2.70	£2.20	£2.00
	1525	£2.70	£2.20	£2.00
	MPS801	£3.60	£3.00	£2.80
	802/1526	£3.70	£2.90	£2.70
	803	£3.40	£2.90	£2.70
	MPS1000	£2.70	£2.30	£2.10
	4022	£2.70	£2.30	£2.10
	MSC801 Colour. One Off			£18.50
	DPS1101 SS	£2.40	£1.90	£1.75
	DPS1101 MS	£2.90	£2.50	£2.30
	DPS1101 Corr	£1.80	£1.50	£1.40
CENTRONICS	GLP 1/2	£3.40	£2.90	£2.70
CITIZEN	120D	£5.00	£4.60	£4.30
DAISYSTEP	2000 MS	£3.10	£2.60	£2.40
	2000 FAB	£4.90	£4.20	£4.00
EPSON	MX/FX/RX80 Black	£2.70	£2.30	£2.10
	MX/FX/RX80 Red or Blue	£3.90	£3.20	£3.00
	100 Series	£3.70	£3.30	£3.00
	LX80/LX86	£2.70	£2.30	£2.10
	JX80 Colour. One Off			£18.50
	LQ800	£3.70	£3.30	£3.10
	LQ1000	£4.50	£3.90	£3.60
JUKI	6000/2200 MS	£4.00	£3.60	£3.40
	6000/2200 Corr	£3.10	£2.70	£2.50
	6100 MS	£2.90	£2.50	£2.30
	6100 SS	£2.40	£1.90	£1.75
	6100 Corr	£1.80	£1.50	£1.40
KAGA	KP810 Black	£3.10	£2.60	£2.40
	KP810 Red or Blue	£4.50	£4.10	£3.80
M/TALLY	MT80	£3.70	£2.90	£2.70
OKI	80/82	£1.40	£1.10	£1.00
	84	£3.90	£3.40	£3.20
	Mate 20 Colour	£7.00	£6.50	£6.20
	Mate 20 Black	£6.60	£6.20	£6.00
PANASONIC	Dot Matrix	£5.00	£4.60	£4.30
QUENDATA	DWP1120 MS	£3.10	£2.60	£2.40
	DWP1120 FAB	£4.90	£4.20	£4.00
QUME	Sprint 7/9 MS	£2.80	£2.30	£2.10
	Sprint 7/9 FAB	£4.00	£3.70	£3.40
SEIKOSHA	GP50	£6.00	£5.50	£5.20
	GP80	£2.70	£2.20	£2.00
	GP100/250	£2.60	£2.20	£2.00
	GP500/550	£3.90	£3.30	£3.10
	GP700 Colour. One Off			£18.50
	SP1000	£6.00	£5.50	£5.20
SHINWA	CP80	£3.70	£2.90	£2.70
SMITH CORONA	Fastext 80 (Twinpack)	£11.70	£11.20	£10.90
	TPI M/S	£12.50	£10.70	£9.95
	TPI Fabric	£5.70	£5.25	£4.95
	TPI Corr	£5.00	£4.70	£4.50
	D100/200	£4.80	£4.40	£3.90
	D300	£6.00	£5.50	£5.30
STAR	DP/GEMINI/SG	£1.40	£1.10	£1.00
	SR15	£4.90	£4.50	£4.30
	NL10	£5.40	£4.70	£4.40

DISK STORAGE

LOCKABLE DISK BOXES

MODEL	SIZE	CAPACITY	PRICE
DD40L	3"/3.5"	40	£8.50
GS100	3.5"	100	£13.90
DD50	5¼"	50	£8.90
DD100	5¼"	100	£11.70
LIBRARY CASE	5¼"	10	£1.50
NON-LOCKABLE DISK BOXES			
MD12/30	3"/3.5"	24	£7.20
MF50	5¼"	50	£8.00

COMPUTER STATIONERY

PLAIN WHITE WITH MICRO-PERF EDGES

SIZE	GSM	QUANTITY	PRICE 1 BOX	2 BOXES
11 × 9½	60	2000	£12.50	£12.00
11 × 9½	70	2000	£15.50	£14.50
EXACT A4	70	2000	£20.90	£18.75
11⅔ × 9¼	90	1000	£13.20	£11.25

LASER PRINTER CONSUMABLES

TONER CARTRIDGES

Epson GQ3500	£18.50	Canon A1/A2	£74.95
Oki Laserline 6	£18.50	Canon A8 Mk II	£84.95
HP Laserjets	£74.95	QMS K8	£74.95
HP Laserjet Mk II	£84.95	Citizen Overture	£22.95

FLOPPY DISKS

5¼"		BOXES OF 10 DISKS 1-2	3-9	10+
JVC inc Plastic Case				
MD-1D	S/side D/dens 40TR	£9.99	£9.50	£9.25
MD-2D	D/side D/dens 40TR	£11.99	£11.50	£11.25
MD-2DD	D/side Q/dens 80TR	£15.99	£15.50	£15.25
MD-2HD	D/side H/dens 1.6MB	£26.99	£25.99	£25.49
MEMOREX				
MD-2D	D/side D/dens 40TR	£11.99	£11.50	£11.25
MD-2DD	D/side Q/dens 80TR	£15.99	£15.50	£15.25
MD-2HD	D/side H/dens 1.6MB	£26.99	£25.99	£25.49
VERBATIM – DATALIFE				
MD525	S/side D/dens 40TR	£11.60	£11.00	£10.60
MD550	D/side D/dens 40TR	£14.80	£14.00	£13.60
MD577	S/side Q/dens 80TR	£14.99	£14.75	£14.49
MD557	D/side Q/dens 80TR	£19.50	£19.00	£18.60
MD HD	D/side H/dens 1.6MB	£27.99	£26.99	£25.99
FUJI	*S/side D/dens 40TR	£10.99	£10.50	£10.25
	*D/side D/dens 40TR	£13.49	£12.99	£12.75

*Coloured Disks – red, green, blue, beige, grey £1.00 per box extra.

	D/side D/dens 80TR	£17.99	£17.50	£17.25
3½"		**BOXES OF 10 DISKS**		
JVC	S/side D/dens	£17.99	£17.25	£16.99
SONY/FUJI	S/side D/dens	£18.99	£18.25	£17.99
FUJI/ MEMOREX	D/side D/dens	£26.99	£26.50	£25.99
SONY	D/side D/dens	£27.99	£27.50	£26.99

3" DISKS

CF2 5 Disks £2.89 each £14.45 pack
CF2 10 Disks £2.49 each £24.90 pack

SPECIAL OFFERS ON DISKS

	PRICES PER 10 DISKS 20 disks	50 disks	100 disks
TDK 5¼"SS/DD	£8.50	£8.00	£7.50
BASF 5¼" SS/DD 40TR	£8.75	£8.25	£7.75
3M 5¼" DS/DD	£11.90	£11.50	£11.25
DYSAN 5¼" HD/1.6MB	£20.95	£19.95	£17.95
Bulk Disks			
5¼"SS/DD 40TR	£6.40	£5.90	£4.80
5¼"SS/DD 40TR	£7.40	£6.90	£5.80
5¼"DS/DD 80TR	£8.40	£7.90	£6.80

Life time guarantee. Disks include envelopes, labels, hub-rings and write protect.

3½"DS/DD	£18.80	£17.80	£16.80

Life time guarantee.

PRINTER CABLES



Amstrad CPC	Parallel	£8.90
BBC	Parallel	£6.50
IBM/Amstrad PC/Atari ST	Parallel	£14.50

PRINTERS

Silver Reed EXP500	**£159.95**
Epson LX800	£192.95
Epson FX800	£299.95
Epson FX1000	£385.95
Epson EX800	£389.95
Epson EX1000	£519.95
Epson LQ800	£437.95
Epson LQ1000	£584.95
Epson LQ2500	£729.95
Epson GQ3500 Laser	£1259.95
Amstrad DMP3000	£149.95
Amstrad DMP3160	£164.95
Amstrad DMP4000	£299.95
Juki 6100	£269.95
Panasonic KXP1081	£139.95
Star NL10 inc I/F	£194.95
Star NX15	£272.95
Star ND15	£342.95
Star NR15	£412.95
Star NB24-10	£419.95
Star NB24-15	£531.95
Star NB15	£659.95

LASER PRINTERS

Epson GQ3500 Laser	£1259.95
HP Laserjet Mk II Laser	£1989.95
Canon LBP8 Mk II Laser	£1599.95
Oki Laserline 6 Laser	£1495.95
QMS K8 Laser	£1549.95
Citizen Overture Laser	£1495.95

AMSTRAD 1512

PC Office System £669.95

Single Drive Mono Monitor	£429.95
Double Drive Mono Monitor	£529.95
Single Drive Colour Monitor	£589.95
Double Drive Colour Monitor	£699.95
S/D Mono + 20 Meg Hard Card	£709.95
S/D Colour + 20 Meg Hard Card	£809.95
S/D Mono + 30 Meg Hard Card	£799.95
S/D Colour + 30 Meg Hard Card	£899.95

NEW PC1640 IN STOCK AT SPECIAL PRICES – PHONE!

DELIVERY **All consumables and software post free** Hardware £5 + VAT 4 Day Delivery £9 + VAT 24 Hour Delivery

FAMOUS SOFTWARE BIG DISCOUNTS

MS Word 3	£239.95	Smart	£379.95
WordPerfect 4.2	£239.95	Symphony	£329.95
WordStar Professional V.4	£199.95	Ventura Publisher 1.1	£599.95
D Base 3 Plus	£319.95	Open Access II	£379.95
Lotus 123	£235.95	PFS-1st Choice	£109.95
Supercalc 4	£195.95	VP Planner	£59.95
		VP Info	£59.95

COMPUTERS BY POST GUARANTEE If after buying any of the hardware or software in this advertisement, you find the same item offered at a lower price locally within one week, we will refund the difference.

Export Enquiries Welcome

All prices exclude VAT

CREDIT CARD HOT-LINE



01-760 0014

Computers by Post (ACU), 14 Emmabrook Court, Sea Road, Rustington, West Sussex.

To: **Computers by Post, 14 Emmabrook Court, Sea Road, Rustington, West Sussex.**

I wish to order ____________________

My computer is ____________________

I enclose cheque/PO for £ ____________ inc VAT

or charge my Access/Visa No: ____________________

Name ____________________

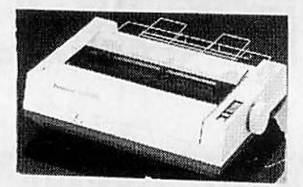
Signature ____________________

Address ____________________

Postcode ______________ Tel No: ______________

Ac. U. 9/87

PANASONIC KXP 1081



with BBC cable & paper
£169.00 (£146.96 + VAT)

Above with Screen Dump & 2m cable
£175.00 (£152.17 + VAT)

	Exc VAT	Inc VAT
KXP 1080 Fabric ink ribbon	3.00	3.45
KXP 1080 View Printer driver	8.65	9.95
KXP 1080 Control Dump rom	13.00	14.95

PANASONIC KXP1082
(as 1081 but 160cps)
with BBC cable & paper
£219.00 (£190.43+VAT)

PANSONIC KXP3131
(17pcs Daisy Wheel)
with BBC cable & paper
£279.00 (£242.61+VAT)

CANON PW1080A
with BBC cable & paper
£239.00 (£207.83+VAT)

KAGA/TAXAN KP810
with BBC cable & paper
£239.00 (£207.83+VAT)

STAR NL10
with BBC cable & paper
£229.00 (£199.13+VAT)

KAGA/TAXAN KP815
with BBC cable & paper
£299.00 (£260.00+VAT)

CITIZEN 120D
with BBC cable & paper
£175.00 (£152.17+VAT)

EPSON LX86
with BBC cable & paper
£199.00 (£173.04+VAT)

JUKI 6100
with BBC cable & paper
£299.00 (£260.00+VAT)

EPSON LX80
with BBC cable & paper
£232.00 (£201.74+VAT)

PRINTER ADDONS

	Exc VAT	Inc VAT
Universal Printer Stand	13.00	14.95
LX Tractor Unit	19.96	22.95
LX Sheet Feeder	47.83	55.00
LX Print Ribbon	3.00	3.45
FX/LQ Sheet Feeder	106.96	123.00
NL-10 Sheet Feeder	47.83	55.00
NL-10 Print Ribbon	4.80	5.52
120D Sheet Feeder	86.09	99.00
120D Print Ribbon	4.00	4.60
KP/PW Print Ribbon	3.39	3.90
Juki 6100 Dust Cover	5.60	6.44
Printer Dust Covers	4.00	4.60

PRINTERS/CABLES

	Exc VAT	Inc VAT
Epson EX800	404.35	465.00
Epson LQ800	469.00	539.35
Epson FX800	313.04	360.00
Epson FX1000	413.04	475.00
Juki 2200 Daisy	225.22	259.00
Juki 5520 Colour	369.57	425.00
Kaga/Taxan KP910/15	360.00	414.00
MP165	173.04	199.00
1.5m (4foot) BBC cable	5.70	6.60
2.0m (6foot) BBC cable	7.74	8.90
Compact printer cable	7.74	8.90
IBM PC printer cable	9.57	11.00

EPROMS, 8271

	Exc VAT	Inc VAT
1-9 27128 250nS	3.83	4.40
10+ 27128 250nS	3.43	3.95
1-9 2764 250nS	3.00	3.45
10+ 2764 250nS	2.74	3.15
1-9 27256 250nS	4.22	4.85
10+ 27256 250nS	3.83	4.40
1-9 TTL/Cmos set	3.91	4.50
1-9 8271 controller	32.17	37.00
1-9 6264LP 150nS	2.56	2.95
Acorn 8271 DFS	41.74	48.00
B Plus 64K to 128K	26.00	29.90

ROMS/UPGRADES

	Exc VAT	Inc VAT
Inter-Word	37.39	43.00
Inter-Sheet	37.39	43.00
Inter-Base	48.70	56.00
Inter-Chart	24.35	28.00
Wordwise Plus	37.39	43.00
Spell Master	40.87	47.00
ACP Disc Investigator	22.61	26.00
ACP 1770 DFS	26.96	31.00
ACP Disc Toolkit	26.96	31.00
View 2.1	33.91	39.00
ViewStore	42.61	49.00
ViewSpell	28.70	33.00

DISKETTES (lifetime warranty)

	Exc VAT	Inc VAT
10 Banana Reversible disks	8.65	9.95
10 96tpi D/S D/D case	13.90	15.99
10 96tpi D/S D/D case	7.39	8.50
10 96tpi D/S D/D in box	6.52	7.50
50 96tpi D/S D/D in boxes	21.70	24.95
100 96tpi D/S D/D in box	31.13	45.00
50 Disc Box hinge lock	7.78	8.95
100 Disc Box hinge lock	8.65	9.95
Black Library case	1.21	1.39

DISC DRIVES

	Ex VAT	Inc VAT
Cumana CSX100	91.30	105.00
Cumana CSX400	124.35	143.00
Cumana CD800S	260.00	299.00
MD400A 400k No PSU	101.74	117.00
MD400B 400k & PSU	116.52	134.00
MD802C 800k No PSU	190.43	219.00
MD802E 800k & PSU	216.52	249.00
MD802D 800k + Stand	225.21	259.00

Phone for full range of Viglen & Torch Winchesters (Hard Discs)

MONITORS

	Ex VAT	Inc VAT
Philips CM8533	230.43	265.00
Philips CM8852	251.30	289.00
Philips BM7502 Green	68.70	79.00
Philips BM7522 Amber	73.91	85.00
Philips BM Tilt stand	7.78	8.95
Taxan KX P31 Green	77.39	89.00
Taxan KK P39 Green	86.09	99.00
Taxan KX Amber	86.09	99.00
Taxan Super Ver 625	317.39	365.00
Microvitec 1451	221.74	255.00
Microvitec 1451 Ap	260.00	299.00
14" Tilt/Swivel Stand	13.87	15.95

(Prices inc. BBC Cable)

MASTER/COMPACT

	Ex VAT	Inc VAT
Master 128K Micro	365.22	420.00
Master ET 128K Micro	338.00	388.70
512 Co-processor	185.00	212.75
Turbo Upgrade	98.78	113.50
Universal 2nd Pro	72.00	82.80
Acorn Z80 2nd P	317.39	365.00
Acorn Cartridges	10.87	12.50
Reference Manuals	14.50	14.50
View 3 User Guide	9.00	9.00
View Sheet User Guide	9.00	9.00
Master & BBC Dust Covers	3.00	3.45
Monochrome Compact	373.04	429.00
Compact 5¼" upgrade	13.00	14.95

Second user BBC Bs available

Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
We are closed all day Wednesday and Saturday afternoons
Carriage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Acorn Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE.
Tel: 0705 325354

BARCLAYCARD VISA

Larger items delivered by Securicor

ACORNUSER
FINEST FAVOURITES



SUPER SUBSCRIPTION OFFER

Subscribe now to *Acorn User*, Britain's leading magazine for the entire BBC and Acorn range of micros, and we will send you the *Acorn User Finest Favourites* cassette, worth £3.95, absolutely free.

The *Finest Favourites* cassette brings together ten of *Acorn User*'s best programs on one cassette. Make music with *Tunemaker*, cheat at *Elite*, create curves with *Lisajous* figures and there are seven more great programs to try!

This offer is only open to addresses in the UK. Don't delay – send off your coupon today!

Please send me a FREE *Finest Favourites* cassette and start my subscription to *Acorn User* with

the ______________ issue and send it to the following address:

NAME ______________________________

ADDRESS ______________________________

____

____

POSTCODE

☐ I enclose my cheque/postal order for £17.50 made payable to Redwood Publishing

☐ Please debit £17.50 from my Access/Barclaycard/American Express

Account No: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry date: ☐☐☐☐

SIGNED ______________ DATE ______________

Send this coupon with your remittance in an envelope to **Gail Fairhall, Subscriptions Manager, Redwood Publishing, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.**

ACORNSOFT ACORNSOFT BBC & ELECTRON

AMAZING OFFERS

£££ SAVE £££

FOR ELECTRON	
VIEW ROM	~~£29.95~~
(Word Processor)	£14.95
VIEWSHEET ROM	~~£29.95~~
(Spread Sheet)	£14.95
ACORN PLUS 1	~~£59.95~~
NOW IN STOCK!	£49.95

ELECTRON COMPUTERS + POWER SUPPLY
IN STOCK NOW!
3 Months Warranty
Only £59.95
Acorn Electron Power Supply £9.95
Scoop Purchase

PACK 1

PLUS 1	£49.95
VIEW	£14.95
VIEWSHEET	£14.95
	~~£79.85~~
OFFER PRICE	£69.95

PACK 2

ELECTRON COMPUTER	£59.95
PLUS 1	£49.95
VIEW	£14.95
	~~£124.85~~
OFFER PRICE	£99.95

VOLTMACE
Twin Joysticks for use with Plus 1 or BBC
~~£19.95~~ £14.95

EDUCATION SPECIALS

Linkword German	~~£14.95~~	Maths 'O' Level	~~£12.65~~
Linkword Spanish	~~£14.95~~	Maths 'O' Level II	~~£12.65~~
Linkword Italian	~~£14.95~~	Biology	~~£12.65~~
I DO	~~£12.65~~	English	~~£12.65~~

ANY 2 FOR £3.95

HOME INTEREST — PRIMARY EDUCATION — BUSINESS — MICROPOWER GAMES

Sentence Sequence*	~~£6.99~~	Watch Your Weight*	~~£6.99~~	Go	~~£7.95~~
Word Sequence*	~~£6.99~~	Theatre Quiz*	~~£6.99~~	Electron Invaders	~~£7.95~~
Snapper	~~£6.99~~	Desk Diary*	~~£6.99~~	Felix & Fruit Monsters	~~£7.95~~
Boxer	~~£6.99~~	Business Games*	~~£6.99~~	Frenzy	~~£7.95~~
Talk Back*	~~£6.99~~	Graphs and Charts*	~~£6.99~~	Chess	~~£7.95~~
Workshop*	~~£6.99~~			Danger UXB	~~£7.95~~

SELECT ANY FIVE FOR ONLY **£7.95** ● ELECTRON ONLY *BBC Compatible

ELECTRON ROM CARTRIDGES

3 GAMES WERE ~~£19.95~~ NOW ONLY £14.95
ROM 1 Stock-Car, Cybertron Mission, Bumblebee
ROM 2 Killer Gorilla, The Mine, Positron
ROM 3 Felix In The Factory, Electron Invaders, Chess

Recent releases at Special Prices

Superior Collection 1, 2 & 3 BBC/Ele	~~£9.95~~	£7.95
Beau Jollys' Computer Hits BBC/Ele	~~£9.95~~	£7.75
Five Star II BBC/Ele	~~£9.95~~	£7.95
Repton III BBC/Ele	~~£9.95~~	£7.95
Grand Prix Cons BBC	~~£9.95~~	£7.95
Oxbridge BBC/Ele	~~£7.95~~	£6.35
Cholo BBC Disc	~~£17.95~~	£14.35
Firetrack BBC	~~£9.99~~	£7.95

ELECTRON LANGUAGES

Lisp Cassette	~~£9.95~~	£2.95
Turtle Graphics Cassette	~~£9.95~~	£2.95
Forth Cassette	~~£7.95~~	£2.50

FIREBIRD (BBC ONLY)

Microcosm	~~£3.95~~	£1.25
Fatman Sam	~~£3.99~~	£1.25
Star Drifter	~~£3.99~~	£1.25

New – IMOGEN

BBC only cassette	£7.95
5.25" disc	£8.95
Compact 3.5"	£10.95

GAMES

Magic Sword	~~£6.95~~	Killer Gorilla	~~£7.95~~
Dennis Through The Looking Glass	~~£6.95~~	Brian Jacks	~~£6.95~~
Classic Adventures	~~£6.95~~	Rubble Trouble	~~£7.95~~
Giroscope	~~£6.95~~	Swoop	~~£7.95~~
Bandits at 3 O'Clock	~~£6.95~~	Croaker	~~£7.95~~
Escape from Moon Base Alpha	~~£7.95~~	Bumble Bee	~~£7.95~~
Ghouls	~~£7.95~~	Positron	~~£7.95~~
Stock Car	~~£7.95~~		

BBC & ELECTRON

ELECTRON ONLY	
Cybertron Mission	~~£7.95~~
Galactic Commander	~~£7.95~~
Moonraider	~~£7.95~~
Position	~~£7.95~~
Jet Power Jack	~~£7.95~~

● *ANY FIVE FOR ONLY* **£7.95** ELECTRON ONLY

CUMA DISC DRIVE INTERFACE FOR ELECTRON £69.95
enables you to use most BBC discs and cartridges up to 32K

CASTLE QUEST *MODEL B*

BBC B DISC	~~£14.95~~	£5.95
BBC B CASSETTE	~~£12.95~~	£5.95

MICROPOWER MAGIC COMPILATIONS I & II

IN THE CHARTS NOW 10 ORIGINAL HITS
FANTASTIC VALUE

BBC B/B+/MASTER CASSETTE	~~£7.95~~	£5.95
BBC B/B+/MASTER 80T DISC	~~£7.95~~	£5.95
BBC B/B+/MASTER 40T DISC	~~£7.95~~	£5.95
BBC COMPACT DISC	~~£9.95~~	£7.95
ELECTRON CASSETTE	~~£9.95~~	£5.95

SCOOP PURCHASE
POWER PACK
7 great games by Audiogenic BBC Cassette
was ~~£9.95~~
NOW ONLY **£4.95**

ELECTRON ROM CARTRIDGES

Logo Cartridge	~~£59.95~~	£29.95
ISO Pascal Cartridge	~~£59.95~~	£29.95
LISP Cartridge	~~£29.95~~	£9.95
Starship Command	~~£14.95~~	£2.95
Hopper Cartridge	~~£14.95~~	£2.95
Elkman ROM	~~£19.95~~	£15.95

Electron Joystick Interface & Software
£14.95

Quickshot II Joystick with microswitch
£12.95

Magic Mushroom (Ele)	~~£12.95~~	£2.95
Me and My Micro (Book only)	~~£2.95~~	£1.00
Electron Advanced User Guide	~~£9.95~~	£2.95



BARCLAYCARD VISA

Send SAE for New BBC Compact 3.5" Software list

AS
Name
Address

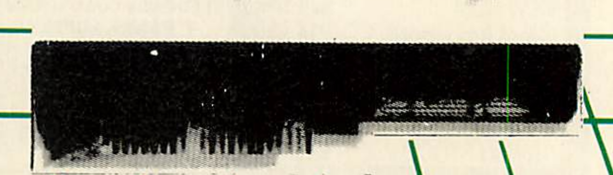
PLEASE ADD 95p P&P and make cheques payable to Software Bargains goods despatched within 48 hours

SOFTWARE BARGAINS
(a division of the micropower group)
Dept AS, 8/8A Regent St., Chapel Allerton, Leeds LS7 4PE
Tel (0532) 687735
(Answerphone w/e & eves)

Advanced Computer Products



"Disc drive compatibility at long last".
ELECTRON USER, JUNE '86



The Advanced Plus Four (A.P.4.)

- A FULLY ACORN COMPATIBLE disc I/face for the 'ELK' & Plus 1
- Accepts any standard 5¼" or 3½" disc drive with PSU
- Supplied with 1770 DFS (as supplied on the B+ & Master series) (A.E.D. is still available for Plus 3 users at £24.15 inc.)
- Page stays at &E00, the same at Tape F.S. NO LOSS of RAM
- Will allow more tape software to be run from disc
- Access compatible BBC disc-based software. No conversion program needed
- Extra sideways ROM socket fitted as standard
- A self-contained, well finished and fully tested product
- No 'short cuts' in design, finish or components
- ROM s/ware includes format, verify, free space and utils.
- Achieve greater BBC compatibilty

£69.55 (+VAT)

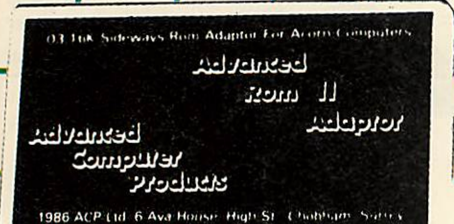
"I can recommend it to anyone contemplating upgrading to disc".
Electron User, June '86
"The AP4 should be considered the standard interface for the Electron".
Acorn User, July '86

AP4 SPECIAL PACKAGE PRICES

AP4 100 = AP4 + 5¼" 40 track S/S including PSU	£199.00
AP4 400 = AP4 + 5¼" track switchable D/S including PSU	£229.00

These prices include VAT and delivery

THE ADVANCED ROM ADAPTOR II



The Advanced ROM Adaptor II
Our versatile cartridge continues to grow in popularity and demand. This ROM/EPROM adaptor is a quality product fully enclosed in an Acorn approved casing, providing full protection for your valuable firmware! A.R.A. 2 not only allows 8K (2764) & 16K (27128) ROMS/EPROMS but also supports 27513 & 27011 devices (when used with the correct software) for which we are currently devoloping new products. Fully compatible with the Master Computer & Electron Plus 1 "The best ROM cartridge is by far the ACP ARA2", A+B Dec 86

ADVANCED PRINT BUFFER (5¼ ADFS) / B / M / C / £5.95
Is a program that runs in sideways RAM and provides a large Print Buffer, instead of the resident 63 bytes. Large means over 14K (14700 characters) allowing letters, reports, documents, listings, etc. to be printed while you carry on with naother task. Full control is provided to switch Buffer on/off. Purge Buffer, even changing the effect <ESCAPE> has on the Buffer (essential when using w/procs such as View)

ADVANCE BBC DFS Eøø (5¼ DFS) / B+ £19.99
Enables B+ or upgraded B users to run 1770 DFS at Eøø when used in 16K sideways RAM

ACORN plus ACP = Plus One
ACP are proud to announce they are now producing the Acorn plus one — **Introductory price £49.95 inc**

AMX MOUSE

POINTS THE WAY FOR THE ELECTRON USER

AMX MOUSE
Catch an incredible AMX MOUSE! The advanced opto-mechanical device that brings to your ELECTRON facilities once only available on more expensive computers. Now you can use ICONS, WINDOWS, AND POINTERS in your own programs.

AMX PACKAGE
Plug the MOUSE into the user port, and the EPROM into your A.P.5. The latter contains fast machine code routines for creating on-screen windows, icons and pointers. And means that the MOUSE buttons can be programmed for use with commercial software such as Wordwise and View. There are two manuals included, explaining how to operate the MOUSE and the ROM routines, which are available in both basic and machine code programs.

Included in the package are two superb programs:

AMX ART has to be seen to be believed! It's a computer-aided drawing program that's just as good for serious applications - such as the preparation of detailed architectural and engineering drawings or teachers' worksheets - as it is for having lots of family fun! And if you're artistically inclined, you'll be astonished at the quality of work you can produce and save. It makes full use of on-screen menus, pull-down menus and icons: the ideal, easy way for novices to learn and gain in confidence.

ICON DESIGNER is an invaluable program for creating and storing icons for use in your OWN programs.

The ACP/AMX mouse package may be used on an ELECTRON fitted with a PLUS I & AP5. The 'ART' software is supplied on cassette but can be transferred to DISC (DFS not ADFS)

£69.95 – MOUSE PACKAGE AND AP5 £125.00

Advanced Computer Products Ltd., 6 Ava House, High Street, Chobham, Surrey. GU24 8LZ Tel: 0276 76545

THIS IS WHAT ELECTRON USER SAID ABOUT A.P.5:-
"Looking at the A.P.5. shows it to be constructed to a high standard, it looks solid and robust. The A.P.5. Interface opens up the new Electron for a whole new type of computing." E.U. Dec '86

NEW PRODUCT
Advanced **Battery-backed RAM** for Master and Electron users. A battery backed 32K RAM cartridge A.B.R. is a self-contained cartridge containing two 16k pages of sideways RAM with a re-chargeable battery back up. Each 16k page can be individually locked by software. Supplied with full software support, to include loading software, ROM save, advanced print buffer and a disc utility MAKEROM.
(08/M/E H) – £39.99
"It's a superb Addon and a must for all serious Electron Users" *EU June*



ADVANCED CONTROL PANEL
(20)/M/B/E/C £34.50
ACP is a front end control panel language providing a sophisticated yet friendly interface between user and computer for access to Languages. MOSS functions and the users own file utility etc. Main features include pull down windows, simple to change MOSS configure, floating point calculator, file manager,
SW ROM's facilities.
(16K EPROM & FULL MANUAL)

ADVANCED DISC TOOLKIT
(01) /M/B/E/C £34.50
Any Acorn user including Master, BBC B+, Electron, DFS, 1770 DFS, ADFS, 2nd. & co-processors A.C.P.'s BEST SELLING product containing over 30 commands inc.:- powerful memory & disc editor, search memory/disc/basic, catalogue/unplug ROMS, load/run programs below page, automatic menu, file transfer (inc. locked cassette files), ADFS utils etc. etc. ("it's superb" ... Database Pubs. - "A top-class toolkit - I have no hesitation in recommending it ... Acorn User Nov. 86)
(16K EPROM & FULL MANUAL)

ADVANCED ROM ADAPTOR 2
(03) /M/E+1/ £14.95
An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8K or 16K EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use -no switching- complies fully to the Acorn (sideways) Rom Filing System. A.R.A.2 contains 2 sockets ...
A single adaptor is also available ...
A.R.A.1 (02)/E/ £10.35 "The best ROM cartridge is by far the ACP ARA 2" ... A+B Dec 86

ADVANCED SIDEWAYS RAM
(04) /E+1/ £29.90
A highly versatile but simple to use s/w RAM cartridge that is automatically write protected on loading. Contains 16K RAM but can be switched (externally) to 2 X 8K RAM. Supplied with instructions & full software support (on cassette) to save ROM images to disc/tape, load RAM from file, Advanced Print Buffer & MakeRom a utility to merge several files from disc to be run from the ROM FS.
(S/Ware on disc : please add ...
£1 5¼ DFS £2 3½ ADFS)

ADVANCED ELECTRON DFS
(05) /E/ £24.15
Electron & Plus 3 users ... gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. A.C.P. also supplies 5¼" disc drives to add to your Plus 3 (inc. 2nd drive adaptor). "ACP has produced another superb ROM for the Electron" ... Electron User Feb '86
(supplied on 16K EPROM + DFS MANUAL)

ADVANCED DISC INVESTIGATOR
(06) /M/B/E/C £28.75
A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40track discs to 80track discs, verify two non-standard discs.
("ADI features an extremely comprehensive sector editor, and one of the finest I've seen"
Tubelink on Prestel)
(supplied on 16K EPROM + manual)

ADVANCED ROM MANAGER
(07)/M/B/E/C *£14.95*
A friendly utility for ROM & sideways RAM. Examine ROM/RAMs, load files into RAM, move memory to/from SWays ROM/RAM, catalogue/kill ROMS, offer commands to specific ROMS, save ROMs to disc/tape, AUTOROM a file (inc BASIC) to run from SWays ROM/RAM, execute specific machine code subroutine in a ROM, generate a ROM's checksum & CRC. "Represents amazing value for money. Go out and buy this real bargain"... Dec 86 Database Publications. (supplied on EPROM + manual)

ADVANCED PLUS 4
(08) /E + 1/ £79.98
"DISC DRIVE COMPATIBILITY AT LONG LAST" (Electron User June '86) this sums up AP4 & ACP's approach to producing products. AP4 is a fully ACORN compatible disc I/face & will accept any standard drive inc. PSU. runs 1770 DFS (as fitted in the B+ & Master), keeps page &Eøø, utils in ROM & provides a spare rom socket. "ACP's PLUS 4 comes out on top. I can recommend it to anyone ..." (E.U. June '86)
AP4 should be considered the standard interface for the Electron (AU July '86)
AP4 100 £199.00 (inc VAT & Securicor delivery)
AP4 400 £299.00 (inc VAT & Sucuricor delivery)

ADVANCED PLUS 5
(09)/E + 1/ £66.70
A triple interface cartridge providing ...
1) a TUBE i/face allowing a second processor to be connected, increasing BOTH speed & memory (PAGE &8øø HIMEM &8øøø in all modes)
2) a 1 MHz BUS for control applications & prommers
3) the USER PORT for mouse and graphic devices.
Also contains 2/3 ROM sockets and on board operating software for 2nd processor.

ADVANCED 1770 DFS
3 versions ADM/C(11) – ADB(12)
ADE (13) £34.50
ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is probably the fastest & most powerful disc filing system your computer could have. With the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC.
(16K EPROM + comprehensive manual)

ADVANCED ELECTRON DFS Eøø
(14) /E+ASR/ £19.99
An alternative to our AED(05) for Plus 3 and ASR users. This optional alternative DFS is designed for use in Sideways RAM (ASR) and allows the user to operate a disc filing system &Eøø when using the Plus 3 (in ADFS page would normally be &1Døø). The DFS is simply loaded using the software supplied with the ASR from disc. (optional upgrade for existing AED users £9.50 on return of original EPROM) (3½" ADFS disc + manual)

NEW EXCLUSIVE PRODUCT ELECTRON ASSEMBLY LANGUAGE
Book by Bruce Smith £4.95 (144)
Software for above book on 3.5" A.D.F.S £3.50 (145) or 5.25" D.F.S. £2.50 (146)

OTHER PRODUCTS & SPECIAL OFFERS

VIEW cartridge	(101) /E+1/	£ 14.95	3½" discs in 1/box	(120) /M/B/E/	£24.00
Vsheet "	(102) /E+1/	£ 14.95	5¼" discs ds/dd"	(121) /M/B/E/	£12.99
VIEW & SHEET	(119) /E+1/	£ 22.00	5¼ discs ss/sd	(122) /M/B/E/	£ 8.99
LISP cartridge	(103) /E+1/	£ 9.99	3½" disc drives		£129.00
E/Adv User Guide	(104) /E/	£ 3.95	5¼" disc drives		£149.00
LOGO cartridge	(106) /E/	£ 29.95	2nd Drive Adaptor	(130) /E+3/	£ 7.95
PASCAL cartridge	(107) /E/	£ 29.95	Compact 2nd Drive Adaptor	(144)/C/	£14.95
VIEW pack BBC	(118) /B/	£ 49.00	3½" library box 10	(124)	£ 2.95
AP4 100	(140) /E+1/	£199.00	16K EPROMS	(131)	£ 3.75
AP4 400	(141) /E+1/	£229.00	VIEWSTORE	(117) /M/B/(e)	£57.95
AP5 + MOUSE Pckage	(143) /E+1/	£125.00	VIEWPLOT	(142) /M/B	£26.95

Equipment codes /M/ = Master /B/ = BBC /E/ = Electron /E+1/ = Electron+Plus 1 /C/ = Compact

Please send order to
Advanced Computer Products Ltd
6 Ava House, High Street,
CHOBHAM, Surrey, England
GU24 8LZ Tel 0276 76545
(mail order only)
All our prices include UK delivery & VAT





(in event of any query - please include your tel. no.)

NAME ....
ADDRESS ....
....
....
POSTCODE ....
TEL. ....
CREDIT CARD No. ....

PROD NO	PRODUCT	QTY	@	TOTAL

I enclose payment for £..............
Exp date .... (A28)

OAK COMPUTERS ODDMENTS SALE.

BBC B & B+ Plastic Keyboard Strip	£1.00 p&p £0.50
BBC B & B+ Keyboard Connector Cable	£1.00 p&p £0.50
2nd Processor Cases	£7.50 p&p £1.50
Disc Drive Cases (single drive colour matching Beeb)	£6.00 p&p £1.50
BBC B & B+ Plastic Cases	£10.00 p&p £2.50
Monitor/Printer Stand	£7.50 p&p £3.00
BBC Upgrade Kit (Processor and Keyboard Housing)	£39.00 p&p £4.50
Uncased new 80T ½ height double sided disc drive. Japanese manufacture	£75.00 p&p £5.00
Last remaining little used Master 128 (3 months old). 12 month guarantee	£345.00 p&p £5.50

NEW Coms Software (Rom) Easy to use-many standard facilities	£17.95 p&p £1.50
NEW Oak Mentor Computer System	
Master 128 compatible, single 80T disc drive, Hi-Res Mono Monitor	£573.85 p&p £14.00
Master 128 compatible, dual 80T disc drive, Hi-Res Mono Monitor	£665.85 p&p £14.00
Master 128 compatible, single 80T disc drive, Hi-Res Colour Monitor	£803.85 p&p £14.00
Master 128 compatible, dual 80T disc drive, Hi-Res Colour Monitor	£901.60 p&p £14.00

Access — VISA

PRICES INCLUDE V.A.T.
Oak Computers, Cross Park House,
Low Green, Rawdon, Leeds, LS19 6HA. **Tel: (0532) 502615.**

SOLID STATE & MECHANICAL DESK TOP DATA SWITCHES
FULL TWELVE MONTHS GUARANTEE

"PRINTERSHARER" Several Micros to one Printer
"PRINTERCHANGER" One Micro to several Printers
"PRINTERCROSSOVER" Two Micros to two Printers

FOR LONG CABLES

Keyzone Solid State Switching Devices can use cables from 1m to at least 30m on input & output without any data loss/error

PARALLEL PRINTERSHARER SOLID STATE MANUAL

Model	Pins	Way	Price
BPS3	26 (BBC)	3	£60
BPS3C	ABOVE WITH INTERLINKS		£75
BPS6	26 (BBC)	6	£110
BPS6C	ABOVE WITH INTERLINKS		£140
APS2	36	2	£75
APS3	36	3	£85
IPS2	25D(IBM)	2	£70
IPS3	25D(IBM)	3	£80

PARALLEL PRINTERCHANGER SOLID STATE MANUAL

BPC3	26 (BBC)	3 way	£60
APC2	36	2	£75
APC3	36	3	£85
IPC2	24D(IBM)	2	£70
IPC3	25D(IBM)	3	£80

PARALLEL PRINTERCROSSOVER SOLID STATE MANUAL

BPX	26 (BBC)	2×2	£70
APX	36	2×2	£95
IPX	25D(IBM)	2×2	£85

SOLID STATE AUTOMATIC PARALLEL PRINTERSHARER

APS2A	Parallel 36 pin	2 way	£105
APS3A	Parallel 36 pin	3 way	£115
APS4A	Parallel 36 pin	4 way	£150
IPS2A	Parallel 25D (IBM)	2 way	£100
IPS3A	Parallel 25D (IBM)	3 way	£110

SERIAL PRINTERSHARER/CHANGER PCB – ALL LINES (NOT HARD WIRED)

SR232	25D-PCB	2 way	£55
SR233	25D-PCB	3 way	£65
SR234	25D-PCB	4 way	£75
SR43	5DIN (BBC)	3 way	£40
SR292	9D(Mac)	2 way	£52
SR293	9D(Mac)	3 way	£59
SR2C	5DIN(//c)	3 way	£40

SERIAL PRINTERCROSSOVER

SR23X	Serial RS232-25D (PCB)	£70
SR432X	Serial 5 pin DIN	£45
SR29X	9 Pin D. (Mac)	£62
SR2CX	5 Pin DIN (//c)(T-Switches)	£45

MECHANICAL T-SWITCHES
FOR SHORT CABLES
PCB – ALL LINES – NOT HARDWIRED

T36-2	Centronics 36 pin 2 way	£60
T36-3	Centronics 36 pin 3 way	£72
T36-4	Centronics 36 pin 4 way	£90
T36-X	Centronics 36 pin 2×2	£90
T25-2	Parallel 25D IBM 2 way	£55
T25-3	Parallel 25D IBM 3 way	£65
T25-4	Parallel 25D IBM 4 way	£75
T25X	Parallel 25D IBM – 2X	£75

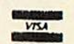
CABLES (STANDARD 6FT)

KPC101	Parallel Interlinks for BBC Switches	£8
KPC101-C	Parallel Interlinks for Compact	£9
KPC103	BBC Printer Cable	£9.50
KPC103	Compact Printer Cable	£10
KSC101	Serial RS232 (10 lines)	£12
KPC106	Serial RS232 (25 lines)	£14
KSC-101	Serial IBM Printer Cable (10 lines)	£12
KPC-106	Parallel Interlink for IBM Switches	£14
KPC-105-6	Parallel IBM Printer Cable (6 ft)	£15
KPC105-10	Parallel IBM Printer Cable (10ft)	£17
KPC104R	Centronics Flat Ribbon Cable 36-36pin	£12
KPC104F	Centronics Flex (Round) Cable 36-36pin	£16

CUSTOM CABLE MAKING SERVICE AVAILABLE



Add postage: Switches £3·00 each, & cable £0·75 each + 15% VAT
KEYZONE COMPUTER PRODUCTS LTD
U14 Acton Business Centre,
School Road, London NW10 6TD
Telephone 01-965 1684/1804 Telex 8813271 GECOMS G







PSPM

Premier Software PM
47 Alderford Street, Sible Hedingham, Halstead, Essex CO9 3HX
Tel. 0787 60426. Prestel MBX 219996438 BT Gold MLK 140

PRINTROM

If Your Printer Can Do It
PRINTROM makes it easier to use

Printrom is a menu driven ROM which allows easy access to all of your printers special functions such as underline, condensed print, emphasized print, double width. As well as being able to be available from the menu these functions are available by typing simple star commands. These star commands can be placed inside Wordwise Plus text and also from within View and almost every other major word processor. It is not possible to state exactly what each version of Printrom will do because that depends upon which printer you use, but here are some of the commands which are implemented on the Panasonic KXP1080/1 version:

- * Underline <On/Off>
- * Emphasize <On/Off>
- * Condensed <On/Off)
- * Speed <U/B> (Uni or Bi directional print)
- * Centre <On/Off>
- * Proportion <On/Off>
- * Margin <Left> (<Right/+Width>)
- * Formfeed
- * Enlq <On/Off>
- * Elite <On/Off>

There are over 30 commands in this version of the ROM so these are just a few examples

Printrom is available for the following printers but if yours is not in this list give us a call and we will see what we can do: Panasonic KXP 1080/1, Taxan Kaga, Cannon PW1080/1156, Most Epsons, Brother M1009, Centronics GLP, Acorn AP100, NEC Pinwriters, Star SQ10 etc.

ROM version £14.95, S/Ways version £9.95
Prince includes VAT but add a pound for P&P

Works with all versions of the BBC Micro

WITH PAYROLL

A LOW COST DISC BASED PROFESSIONAL ACCOUNTING PROGRAM
For the BBC Computer

"Micro-Trader"
INTEGRATED SALES PURCHASE AND NOMINAL LEDGERS

Designed for business use by a business man. "Micro-Trader" offers full Sales and Purchase Ledger facilities including SALES INVOICE and STATEMENT PRINTING with a capacity of up to 1,000 accounts and 5,000 transactions per month.

Nominal Ledger features quick and easy entry of everyday transactions. Up to 6 Bank Accounts, full V.A.T. facilities, Journal Posting. Full Reporting for individual accounts, Audit Trail, Trial Balance, Profit & Loss and Balance Sheet.

"MICRO-STOCK"
Stock Control program, fully integrated with "Micro-Trader". 4,000 Stock Items with user defined Codes. Invoice and Credit Notes and Cash Sales routine. Full Stock Held Reports.
£75.00 + V.A.T.



"EXTENDED PAYROLL"
Micro-Aid Full Feature Extended Payroll. For use stand alone or integrated with "Micro-Trader".
£49.95 + V.A.T.

"MICRO-MAILER"
A Mailmerge program, fully integrated with "Micro-Trader". With a user Database.
£30.00 + V.A.T.





PHONE TODAY FOR A FREE FACT SHEET

MEADOW COMPUTERS
11, LONDON STREET, WHITCHURCH, HAMPSHIRE, RG28 7LH
Telephone: Whitchurch (0256) 892008

MEGA BYTES FOR MINI BUCKS

Picture shows 20 and 28 megabyte units. 40 and 56 megabyte units may be slightly taller in size.

	PRICE INC V.A.T.
Drive 0 Single	
VB20 20M Winchester	649.95
VB28 28M Winchester	699.95
VB40 40M Winchester	1045.95
VB56 56M Winchester	1119.95
Drive 1 Second Drive	
VB120 20 M Drive 1 Winchester	549.95
VB128 28M Drive 1 Winchester	599.95
VB140 40M Drive 1 Winchester	819.95
VB156 56M Drive 1 Winchester	899.95
Acorn ADFS ROM with utilities (essential for BBC B and B Plus)	29.95
Acorn 1770 upgrade kit (BBC B)	49.95

Plug in 20 to 112 MBytes of extra storage with the Viglen Winchester System

If you want to increase your storage capacity up to an incredible 112 MBytes you need a Winchester; but not just any Winchester ... the new Viglen System is 100% compatible with the Acorn Winchester, it's simplicity itself to install and it costs a lot less than you think.

The Viglen Winchester is ready to plug straight into your BBC Master or if you have a B or B plus you will simply have to fit an ADFS ROM. You can use up to two floppy disk drives in conjunction with the unit and, fitted to the B+ or Master, the floppies can double their capacity by running in double density mode.

The 112 MBytes Viglen Winchester System is equivalent in capacity to over 1000 100K floppies or 250 400K floppy disks. It takes under 2.5 seconds to save 200K bytes, making it at least ten times faster than the equivalent floppy disk options. The system is designed for virtually every application from education or business to home use.

WHAT DO I GET FOR MY MONEY

1. Winchester Unit – (winchester drive, controller boards, power supply and fan all fitted in one compact case). The fan is recommended in order to keep the winchester at the correct operating temperature.
2. Master Reference manual part 1 (for a BBC B or B plus you will require the Acorn ADFS ROM and utilities available at an extra cost).
3. Winchester user guide.
4. Additional utilities on the winchester including formatter, verifier, ADFS menu and backup program.

PLUG IN SECOND DRIVE

The Acorn ADFS can handle up to two winchester drives. These are accessed as drive 0 and 1 (the floppy disk drives being accessed as drives 4 and 5). Viglen winchesters are supplied as Drive 0 (single unit) and Drive 1 (Second drive for single unit). The Viglen drive 1 can be instantly plugged into drive 0 and used either as a backup for Drive 0 (and perhaps taken off and stored away) or for more online mass storage. This will enable you to back up *20 Megabytes in under 7 minutes.*

STORAGE OPTIONS:-

Drive 0	Drive 1	Total Capacity
20 Meg	20 or 40 Meg	40 or 60 Meg
28 Meg	28 or 56 Meg	56 or 84 Meg
40 Meg	20 or 40 Meg	60 or 80 Meg
56 Meg	28 or 56 Meg	84 or 112 Meg

COMPATIBILITY?

Viglen winchesters are 100% compatible with the Acorn winchesters and the ADFS. Any program that will run on the Acorn winchester will also run on the Viglen winchester. The winchesters also run with the Acorn Master 512 board with DOS plus (CPM86 and MSDOS compatible operating system).

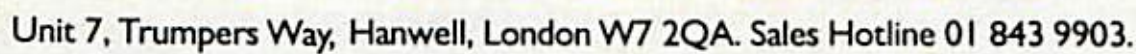
BACK OF UNIT

1 MHz IN: This socket is used to connect the micro to the winchester.
1 MHz OUT: This socket is used to connect any other device that is normally plugged into the 1 MHz bus on the micro.
DRIVE 1 DATA: This is a 20 way socket which is used to connect the data signals to a second winchester drive.
DRIVE 1 CONTROL: This is a 34 way socket which is used to connect the control signals to a second winchester drive.

HOW TO ORDER

Simply write off today to Viglen and remember to add £8.00 carriage, packing and insurance, and allow 7 days for delivery. Credit card holders may order by telephone. If you'd like to find out more why not come down to our West London showroom (see map for directions) or if you can't make it simply ask for our special datasheet.





Unit 7, Trumpers Way, Hanwell, London W7 2QA. Sales Hotline 01 843 9903.

VIGLEN
BOSTON MANOR

Callers by appointment

Orders from Educational Establishments, Government Departments and Plc Companies accepted. Education discounts available, please call.

Prices correct at time of going to press and subject to availability.

ACORN ELECTRON COMPUTERS

These computers are fully tested and guaranteed and can be purchased direct from SLOGGER or through certain dealers. The demand for this computer has prompted SLOGGER to offer both the TURBO ELECTRON and the 64k ELECTRON as well as the standard 32k ELECTRON.

	ONLY
32k Electron	64.00
TURBO Electron (switchable)	85.00
64k Electron (switchable)	99.00

GREEN SCREEN MONITORS

SLOGGER has an offer a limited quantity of Green Screen monitors. These monitors are ideal for Word Processing in 80 column mode giving good clear consistant text.

A MUST for VIEW or STARWORD users.

Complete with all cables suitable for the Acorn Electron computer (or BBC)

Fully tested £90.00 inc carriage.

MASTER RAM BOARD

Upgrade your Electron to a 64k Machine using 32k of SHADOW RAM

★ Fits inside the Acorn Electron, uses no cartridge ports
★ Compatible with ALL reliable Electron hardware (except TURBO DRIVER)
★ Compatible with ALL Electron software, switching between 64k mode, TURBO mode (yes . . . the TURBO DRIVER IS BUILT IN), and normal mode.
★ For correctly written software, HIMEM is ALWAYS AT 8000 in 64k mode so leaving 28000 bytes for BASIC or WORD PROCESSING in ALL screen modes
★ Doubles the speed of Word Processing
★ Up to 300% speed increase for games
★ Additional 12k for use as Printer Buffer with Expansion ROM 2.0
★ Installation Service for those not confident of soldering

"I can thoroughly recommend it," . . . Electron User 1987

Master RAM Board kit – code MR2 – Now only £49.95

Parcel Post Amount of postage to be paid by licensee

Postage Forward Parcel Service Licence no. GJC1

No postage stamp necessary unless posted in Channel Islands Isle of Man or Republic of Ireland

Date stamp

P

SLOGGER LTD
107 RICHMOND ROAD
GILLINGHAM
KENT
ME7 1BR

SEDS
THE COMPLETE DISK SYSTEM UPGRADE

Imagine . . . 400k of memory instantly available . . .
Games loaded in seconds . . .
Word Processing files loaded or saved in seconds . . .
BASIC programs loaded or saved in seconds!!!
This is the power of the disk system.

Requiring either the ROMBOX PLUS or the ACORN PLUS 1, SEDS is comprised of the following:
– High quality 40/80 switchable double sided 5¼ inch, BBC compatible drive with built in power supply unit.
– The Slogger Electron Disk Interface (SEDI)
– The Slogger Electron Disk Filing System (SEDFS)

SEDS ONLY £199.95

SEDI
SLOGGER ELECTRON DISK INTERFACE

This unit fits into the ROMBOX PLUS or ACORN PLUS 1 and provides the signals to control any standard 5¼ or 3½ inch drive. Supplied complete with SEDFS installed with appropriate documentation.

SEDI ONLY £74.95

SEDFS
SLOGGER ELECTRON DISK FILING SYSTEM

★ FULLY ACORN DFS compatible
★ OSWORD 7D, 7E and 7F implementation
★ FORMAT and VERIFY and other utilities built in
★ Page E00 . . . NO LOSS OF ELECTRON MEMORY
★ OPT commands for faster drives
★ FULLY compatible with BASIC Filing system commands
★ FULLY compatible with machine code programs
★ Extra Sideways ROM socket
★ TAPE to DISK available (T2SEDFS)
★ Designed by CAD (Computer Aided Design)
★ Excellent comprehensive 90 page documentation.

"SEDFS is so good that I can't easily find fault with it, the manual is quite simply the best of the type I have seen, to suit everyone from the beginner to the professional."
"The SEDFS peformed admirably throughout . . ."
"Anyone considering upgrading disks, SEDFS is the logical choice."
"I can recommened SEDFS unreservedly" . . . Electron User, June 1987

THE ELK TURBO DRIVER

(Designed by Andyk Ltd)

RUNS ELECTRON SOFTWARE AT SPEEDS COMPARABLE TO THE BBC

★ Doubles the speed of Word Processsing.
★ Up to 300% speed increase for games.
★ Fitted internally – occupies no cartridge ports.
★ Switchable "Normal/Turbo" speed.
★ Compatible with ALL existing hardware and software products (except the Master RAM board).
★ Installation service – for those not confident of soldering.

"This upgrade should be standard on all Electrons"
Electron User, July 1986

Turbo Driver Kit – code **TD2** – only **£29.95**

Installation Service

★ Guaranteed to upgrade your Electron with either the Master RAM Board or Elk Turbo Driver AND RETURN IT WITHIN 7 DAYS OF RECEIPT.
★ Includes Postage paid BOTH WAYS (using FREEPOST) and 1 YEAR'S GUARANTEE.

PLEASE NOTE . . . if you own a PLUS 1, please send it with your Electron to be tested to ensure reliability at high speed.

ACORN PLUS 1s

Slogger has on offer a limited number of Acorn PLUS 1s. These units are brand new but nonetheless fully tested in Slogger's factory.

ONLY **£44.95**
(£50.00 with EXP ROM 2.0)

ROMBOX PLUS

SLOGGER's answer to PLUS 1

Q. Why not buy the ACORN PLUS?
A. Because, *"excellent though the PLUS 1 is, I think there is still room for improvement"* said the Electron User magazine.
The ROMBOX PLUS has this improved specicification:

1. Four ROM/RAM sockets to free the cartridge slots for more important add-ons. Each socket can take the usual 8K/16K ROMs but can also take 16K RAMs offering a staggering 64K SIDEWAYS RAM.
2. The PLUS 1 cartridge slots.
3. The PLUS 1 centronics printer port.
4. The Expansion ROM 2.0
5. Switched Joystick interface available.
6. Analogue Joystick interface still under development.

Still only **£54.95**

32K SIDEWAYS RAM CARTRIDGE

for ROMBOX PLUS or PLUS 1

★ Ever popular on the BBC.
★ Best used with EXP ROM 2.0
(1) Save ROM backups for loading into Sideways RAM
(2) Set up a 16K Print Buffer
★ Splits as 2 × 16K pages.
VIEW and VIEWSHEET in one slot!!!
★ Write protect option . . . prevents corruption of software.

"A very powerful piece of hardware"
. . .Electron User July 87

ONLY £34.50
(£39.50 with EXP ROM 2.0)

SLOGGER EPROM CARTRIDGE

★ Carrys TWO 8k/16k ROM/EPROM software
★ Compatible with PLUS 1, ROMBOX PLUS and BBC Master.
★ Simply plugs into cartidge slot.

£10.00 FOR LIMITED PERIOD

TAPE K10 DISK ROMs VERSION 2

★ Transfer the majority of tape programs to disk.
★ Acornsoft, Superior and Micropower no problem.
★ Compatible with programs copied using Version 1.
★ More successful than ever before.

T2P3 for the Acorn Plus 3
T2CU for the Cumana DFS
T2P4 for AP4 and E00 DFS
T2SD for the Solidisk DFS
T2SEDFS for the SEDFS

ONLY **£24.95**

* Upgrade 1-2 only £5 with original ROM

JOYSTICK INTERFACE

FOR ROMBOX PLUS or ACORN PLUS 1

★ Uses cheap ATARI-type joysticks.
★ Compatible with ALL Tape and Disk systems
★ Emulation of keys by Expansion ROM 2.0
★ Can be used with well written games either WITH OR WITHOUT A JOYSTICK OPTION.

"The ultimate Joystick Interface" . . .A&B July 87
"Well worth saving up for, I can recommend it to all Arcade addicts". . .Electron User May 87

ONLY **£14.95**

★ Requires Electron Expansion 2.0
. . . only £5 with this unit

JOYSTICKS

Switched Joysticks for the Slogger Joystick Inerface.

Quickshot I £4.00
Quickshot II £6.00

EXPANSION ROM 2.0

for the ROMBOX PLUS and PLUS 1

★ Support Printer Buffer with 8K/16K sideways RAM or 12K with MASTER RAM BOARD.
★ RSAVE command to save ROM images to Tape or Disk.
★ RLOAD command to load Sideways RAM with a ROM image.
★ ROMS command to displays ROM/RAM in system.
★ JOYSTICK command for the SLOGGER Joystick Interface.
★ Allows cassette loading in high resolution.
★ Supports all standard functions (Printer, ADC, RS423).
★ Simply fits into internal ROM socket.

"There is room for improvement in the operating system. No doubt this was the idea behind Expansion 2." Electron User, July 87.

ONLY £11.95

PRINTER

AMSTRAD DMP 2000

* Full EPSON compatiblity
★ Ideal for listings, Word Processing and graphics.
★ Prints 105 characters per second in draft mode.
★ 52 characters per second in Near Letter Quality (NLQ).
★ Built in 2k buffer to increase thoughput.
★ FREE lead suitable for ROMBOX PLUS or PLUS 1.

Excellent value at only **£185**

ROM SOFTWARE

STARWORD	£34.50
STARSTORE 2	£29.95
SEDFS upgrade ROM for CUMANA owners	24.95

BARGAIN CORNER

STARSTORE	£9.95
STARMON	£9.95
STARGRAPH	£9.95
PRINTER ROM	£9.95
STAR TREK	£9.95
ELKMAN	£9.95
PDG	£9.95

OTHER PRODUCTS

5.25" 40/80 Track D/s disk drive inc. PSU	£149.00
3.5" 40/80 Track D/S disk drive inc. PSU	£140.00
Printer lead (for ROMBOX PLUS/PLUS 1)	£9.95
Electron Advanced User Guide	£3.95
Vine Micros ADDCOM	£28.00
Vine Micros MATRIX ROM	£36.00

SLOGGER'S AUTHORISED DEALERS

ABERDEEN
Micro Logic
0569 66233
BIRMINGHAM
Allen James Computers
021 778 5737
BRISTOL
Avon Computer Exchange
0272 637981
BROMLEY
Datastore
01 460 8991
BURNLEY
Atomic Computer Systems
0282 54299
BYFLEET
Calancraft
0932 342137
CARDIFF
Computer Exchange
0222 483069
CARDIGAN
Cardigan Electronics
0239 614483
CHESHAM
Reeds Photo & Computing
0494 783373
CROYDON
Computer Centre
01 683 2646
FAREHAM
Project Expansions
0329 221109
FARNHAM
Farnham Computers
0252 723107
GLASGOW
Computer Depot
041 332 3944

LEICESTER
DA Computers
0533 549407
LONDON
Compuface
01 580 0181
LUTON
Hobbyte
0582 457195
MARKET-HARBOROUGH
Harborough Computers
0858 635280
NEWBURY
M&S Associates
0635 45774
SHEERNESS
Swaletek Systems
0795 665530
STOCKPORT
Dram Electronics
061 429 0626
TELFORD
A1 Computer Supplies
0952 502737
TROWBRIDGE
West Wilts Micros
02214 62759
ULVERSTON
Skand Computers
0229 56984
WARRINGTON
Cheshire
0925 414109

NETHERLANDS
Velobyte Computers
Rotterdam 010 413 8197

MAIL ORDER ONLY
MILTON KEYNES Towerhill 09808 74246
STOCKPORT 21st Software 0625 528885

All prices include VAT P&P UK Mainland only

SEND FOR THEM TODAY

Cheques payable to
SLOGGER LTD

Access No ______ Expiry Date ______
Visa ______
Name ______
Address ______

PLEASE SUPPLY | Cost
1.______ £______
2.______ £______
3.______ £______
4.______ £______
5.______ £______
Total £______

Please send orders to SLOGGER LTD, 107 RICHMOND ROAD, GILLINGHAM, KENT



Tel: 0634 52303



SEE the first software, hardware and books for the Archimedes from companies like Acornsoft, Clares, Minerva, Computer Concepts, and many others.

BUT THAT'S NOT ALL!

- ★ Hardware and software galore for BBC Micro and Electron owners
- ★ Lots of bargains for the BBC Micro and Electron at rock-bottom prices
- ★ Technical advice from the experts over the whole range of Acorn machines

10am-6pm, Friday November 13
10am-6pm, Saturday November 14
10am-4pm, Sunday November 15

Here's your personal invitation to try out the revolutionary Archimedes for yourself

Be one of the first to play Zarch, the spectacular new game that is the first to make use of the Archimedes' incredible speed to magnificent effect – the four-directional scrolling really has to be seen to be believed!

Come along and meet the author, David Braben, creator of Elite. Try your hand at the game itself . . . and prepare to be amazed!

All this – and much, much more – at the 17th record-breaking Electron & BBC Micro User Show.

Save £1 a head with this advance ticket order

Please supply:

☐ Adult tickets at £2 (save £1)................................ £

☐ Under-16s tickets at £1 (save £1)........................ £

Total £ ____

☐ Cheque enclosed made payable to Database Publications Ltd.

☐ Please debit my credit card account

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signed...

Admission at door:
£3 adults, £2 under 16's

Post to: *Show Tickets, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.*

ELECTRON & BBC MICRO USER SHOW

Name...

Address...

....

....

PHONE ORDERS: Ring Show Hotline: 061-480 0171
PRESTEL ORDERS: KEY *89, THEN 614568383
MICROLINK ORDERS: MAILBOX 72:MAG001
Please quote credit card number and full address

A053

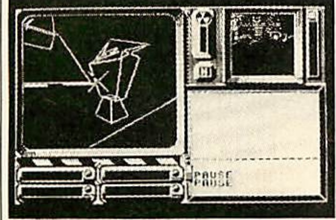
LETTERS

Write to Letters, Acorn User, 141-143 Drury Lane, London WC2B 5TF

CHOLO CHAOS

Sir, I thought readers might be interested in my experiences with the new game *Cholo*. Having been inspired by the rave reviews that the game has received, I recently went out and purchased a copy.

Imagine my anticipation as I feverishly ripped open the disc box, inserted the disc into my drive and pressed Shift-Break. My initial entry into the game confirmed much of what had been written. I quickly found the computer room and read in the program, and then... disaster struck.



***Cholo* – compatibility problems**

The Pass Txt program refused to run and the keyboard froze. What had I done? What part of the instructions had I misread? To recover I re-booted the system, only to have the same problem once again.

BT informed me that *Cholo* 'is only compatible with Acorn DFS systems'.

So come on BT, either produce products which can be run on the majority of BBCs, or put warning stickers on your software that say 'Acorn DFS only'. I really think the attitude of 'buyers beware' is dubious for a major company.

Martin Meggs
Bedfordshire

Tony Beckwith of Firebird Software replies:

Early copies of *Cholo* were incompatible with many non-Acorn disc filing systems.

There is now a second version of *Cholo* which is compatible with a greater number of DFSs, and with 40 or 80-track drives. This new version can be recognised by the lack of a label on the disc. It still doesn't work with double-density systems, but a special version for the Watford DDFS is being developed and should be released shortly.

THE MIJAS TOUCH

Sir, Thank you for publishing the review of our 65(C)02 development system in the July issue of *Acorn User*.

There were however a small number of technical points which I would be grateful if you could bring to the attention of your readers.

We have now added the ability to use internal addresses as single bytes by allowing literal operands of the form #>... and #<... This was needed for our new C compiler.

Source-level Debug seems to be a product which the programmer needs to use before its massive advantages appear. One major computer manufacturer kept it under wraps in its laboratory believing that no one would want it. In despair someone leaked a few copies and within a few months it was inundated with enquiries!

John F Evans
Mijas Software

Lack of space also prevented the review pointing out the speed advantage to be gained from the relocatable assembler. Each individual 'code module' needs to be assembled only once – in order to produce a new version running at a different memory address it only requires a re-linking of the various modules, and this is a considerably faster process than carrying out a complete reassembly of the code.

OLD FOOL

Sir, As a break from the almost continual activity of searching for a suitable job (I was made redundant last year at age 46), I have been glancing through back numbers of *Acorn User*.

When I first read your April 1985 issue I had been intrigued by the 'Program of the Month' for a touch screen. I had never got round to typing it in but as my typing speed has now improved through the practice I have had in writing so many letters, I decided to have a go; the program is quite short and I felt I could do it in about half an hour.

I must say that the result exceeded my highest expectations and went a long way towards relieving the tensions of my situation. Whether the tears in my eyes came about through my appreciation of the usefulness of the program or not, I leave for you to judge. I would just say it was worth waiting two and a half years for, even if the month was wrong, and I can now better appreciate the finer points and explanations in the editorial supporting the program!

Roger Pickard
Sussex

Reading your letter cheered us up too, it's nice to know you keep the magazine for so long! You might like to try Martin Phillips' April Fool program (April 1986) as well, one of our favourites.

CHANGES TO THE EDITOR

Sir, In the June '87 issue of *AU*, a reader had run into the same problem as me. It is the superb piece of software called *Beebed*, a Basic program editor from J & O Software, which will not work on the Master. The reason for this is that *Beebed* makes calls to Basic for the tokenising of lines and for some other purposes. In the Basic 4 of the Master the addresses are not the same as in older BBC B's Basic.

I have found a solution for this. Put a Basic 2 ROM from a BBC B into a cartridge together with the *Beebed* ROM. Use *UNPLUG 12 to disable the Basic 4 in the Master and *CONFIGURE LANG 14 to select *View* as the default language. Press CTRL-Break, then *BASIC, and you are back to using Basic 2 and *Beebed* on the Master. To get back to Basic 4, just unplug the cartridge, type *INSTALL 12 and *CONFIGURE LANG 12 and press CTRL-Break.

Jan Petter Naess
Norway

LETTERS

FRONT-END ADJUSTMENTS

Sir, I read with interest the article by Joe Telford in the June 87 edition of *Acorn User*, concerning the front-end for the Master. I have an expanded BBC Model B, with the following additions: Solidisk 1770 disc interface, with their ADFS; Solidisk 4MHz 256k expansion, which gives shadow and sideways RAM; and Solidisk real-time clock, which emulates that of the Master, and also gives *CONFIGURE and *INSERT/UNPLUG facilities.

With this combination, I have typed in the listings in the yellow pages, and been able to get the front-end to work with only very few program amendments.

No modifications are needed to *Starmaker*, *Iconmaker* and *Filemaker*. The following amendment is required to *Joevdu*, to allow for the fact that the character set is permanently exploded on the Master, but imploded on the Model B:

```
50 IF?&246=0THENPAG
E=PAGE+&100:OSCLI"FX20
,1":CHAIN"JOEVDU"
```

Because the 256k expansion board uses banks &8 to &F for sideways RAM, but also normally uses bank 8 for shadow RAM, the following changes are needed in *Joetop*:

```
2330 IFskt%<9ORskt%>1
5PROCok("Can't load to
 ROM sockets!"):ENDPRO
C
3620 IFx>8ANDx<16PRIN
Tram1$;fa$(w,x);ram2$;
STRING$((10-LEN(fn$(w,
x)))/2," ");fn$(w,x);:
ENDPROC
```

The command to load a sideways ROM image is different, so the following change is required:

```
2470 OSCLI("RLOAD "+S
TR$~skt%+" "+fb$)
```

This defaults to a load address of &8000, so lines 2380-2440 are redundant, but can be left in, by responding with Return to the prompt.

The real-time clock uses a '1' to denote an unplugged ROM, rather than '0'; also it uses registers 8 and 9. The following changes are necessary because of this:

```
6480 A%=161:X%=8+(s%D
IV8)
6490 =(2^(s%MOD8)=(((
USR(&FFF4)AND&FF0000)D
IV&10000)AND2^(s%MOD8)
))
```

Finally, there are some commands in the listing which are specific to Basic 4. It is necessary to use the expanded VDU... form, where VDU ... has been used in lines 5400 and 5850. Also, instead of PRINTTIME$ in line 1060, I used OSCLI"TIME".

Having made these changes, I have been able to use the suite in exactly the same way as described in the article, and have found it to be extremely user-friendly.

M J Fowler
Bucks

SORTING OUT SPELLMASTER

Sir, I am writing in response to James Ducat's letter in the July issue. He states there is no easy way to delete all the text in *Wordwise Plus*. In fact this is easily achieved from the menu page by typing ':NEW' (lower case is also accepted).

I would like to offer some help to readers who may be having the problems I experienced when using Computer Concepts' *SpellMaster* ROM in conjunction with the Solidisk 256 board.

The problem arises when trying to create or add to a user dictionary in sideways RAM, when other ROM images (for example the Solidisk printer buffer) are resident in other RAM banks. Unless the 256 board recognises the user dictionary as the 'active' bank, it is not possible to add words to the dictionary. This may be overcome by using the RAM access register to select which RAM bank is currently selected for write operations. This is achieved in practice by prefixing ROM-loading commands with ?&FE32=n, where n is the RAM bank number.

Of wider interest to *SpellMaster* users in general, the !BOOT file may be used to set up the spelling checker to perform immediate checking as you type, by using the *FX138,0,X command to simulate key presses. X is the ASCII value of the required key press. To set up the immediate check, after entering *Wordwise Plus*, enter *FX138, 0, 27 (Escape to enter edit mode); *FX138, 0, 10 (CTRL-J to pull down the *SpellMaster* menu); *FX138, 0, 53 ('5' to turn on the immediate check) and finally *FX138, 0, 27 again to return once more to the main menu.

Dr W Saywell
Hants

HIGHLIGHTING VIEWSHEET

Sir, I am sure I am not the only one of your readers who, having taken encouragement from Martin Phillips' article (July issue), have put *ViewSheet* to good use and are now frustrated because it is apparently impossible to exercise proper control over *ViewSheet*'s printed output.

I have read the manual from cover to cover and note that highlights 1 and 2 are available, providing a suitable printer driver is installed and the highlights are switched on in the printer window definitions. Unfortunately the manual offers no hint as to how highlights 1 and 2 are invoked on the sheet itself, not to mention the use of further highlights. How is this done?

Another problem exists when one requires a page throw following completion of a printer window and before printing another. I would be greatly relieved to know the secret of how it's done.

K K Whyand
Dorset

The highlights can be set by putting 1 or 2 into the printer window definition under Opt:

```
Wi TopL BotR Pos
PO A1   I26

Cw Bw Fmt  Opt
7  7  D2RM TS2
```

This whole window will print out in bold. The highlights don't need to be put on the sheet at all.

Only highlights 1 and 2 can be used, but other options are explained in Graham Bell's article on page 157.

Perhaps a reader knows how to incorporate a page feed at the end of a window?

PATCHING UP THE RAM

Sir, An article by Manek Dubash in the May issue of *Acorn User* drew attention to the inability of *View 2.1* to scroll properly when used with some shadow memory sytems.

This same problem had annoyed me for some time, and although Manek refers to it as much publicised, I could not recall any previous mention of it. This week however, I noticed a patch program from Acorn, published in the July 1985 issue of *AU* (page 112).

I can report that the patch, although intended for the B+, works well on my model B with Solidisk shadow memory, rectifying the problem.

Alan M Rowley
Shropshire

LETTERS

POUNDING AWAY

Sir, I have *Wordwise Plus*. My Juki 6100 requires 'ES73' every time I want it to print the £ sign. It's a bore trying to type 'ES73' each time with the embedded commands as well, the search and replace routine would require a fair number of keypresses (even if I could make it work) and even a pre-programmed function key needs Shift-CTRL-f>n< each time it's wanted.

So the following little routine is !Booted into one of the segments. Jaquetta Megarry explained how to write !Boot files in *Wordwise Plus* (*AU* Sept page 164) – so simple.

```
   CURSOR TOP
   REPEAT
   A$="£"
   FIND A$
   REPLACE A$,"<f1>ES7
3<f2>"
   UNTIL EOT
   CURSOR TOP
   DISPLAY TEXT
```

While editing I just use the £ sign wherever I need it and then when I have finished I call the appropriate segment using Shift-<fn>.

David McLeod
Hampshire

INFORMATION EXCHANGE

Sir, We are an Adult Training Centre for the mentally handicapped and as part of our educational programme, we use BBC Master computers in conjunction with Microvitec 501 touch-sensitive screens, Concept Keyboards, various switches, etc. We would like to contact other BBC micro users, who have experience of their use in the mental handicap field, so that we can exchange information, etc.

I can be contacted at the Burton Adult Training Centre, Shobnall Street, Burton upon Trent DE14 2HE.

Brian J Kitchen
Staffordshire

HELPING WITH HOBBIES

Sir, I would like to congratulate you on June's issue. It was refreshing to find significant articles dealing with the use of computers in solving non-computer problems. It is all too easy for hobbyists to become obsessed with solving problems that they would not have had if they had not taken up the hobby! In photography you can find magazines that talk about nothing but equipment, and not about pictures and hi-fi magazines go on about wow, flutter and distortion but never once mention music.

Could I suggest that future articles should cover such things as the use of spreadsheets and databases, using the BBC micro versions as examples in dealing with the problems and opportunities? For instance, I did consider using *ViewStore* to index my slide collection, only to abandon the idea when I realised the difficulties of identifying and classifying all the slides, and also the sheer amount of work involved in data entry.

Wordprocessing could be covered with reference to the techniques of mail merging and pre-written paragraphs. There could also be something on the good and bad points of spelling checkers, such as the fact that they will not find the right word in the wrong place; and the fact that every spelling checker I have met includes some uncommon spellings that I would not use.

Another article could usefully cover drawing techniques. I came across the program *Timpaint* on the Master Welcome disc, and when I tried to use it, I found myself hampered by the fact that I didn't really know how to draw. Although it would not be possible to make me into an artist in one article, you might be able to find someone who could give me some ideas.

David H Wild
Hertfordshire

The best use of computers is made by people who have a specific job to do and make their system do that.

Problems such as making database entries are rarely mentioned and if you're going to start typing them in, you must have a very definite established need to warrant the weeks of work needed.

Martin Phillips did cover databases in Hints & Tips, and *ViewSheet* was covered in July, when I hope you also noted Bruce Smith's comments on spelling checkers.

It's nice to be able to agree with a letter, and on your final point, graphics techniques will be covered in our December issue.

ROM REMEDIES

Sir, Recently I purchased *SpellMaster* for my BBC model B from Computer Concepts, which I put in socket 13, and the *NLQ Designer* ROM from Watford Electronics, which I put in socket 14. After using these products I tried to load a dictionary from disc into sideways RAM for *SpellMaster* using *DLOAD; the computer crashed. I subsequently discovered that there was a command clash between these two ROMs, *DLOAD also being availabe on the *NLQ* ROM. There are two possible remedies for this:

1) Switch the ROMs round, so that *SpellMaster* has higher priority and use the W prefix available for * commands on Watford Products. A simple solution but time-consuming and risking chip damage.

2) Use an undocumented prefix in *SpellMaster*. Upon experimenting I discovered that a 'C' prefix can be used, ie, typing *CDLOAD will work perfectly and no moving of chips is required.

The availability of this prefix is *not* mentioned in the *SpellMaster* manual but is, obviously, very useful. A request to Computer Concepts and other ROM manufacturers: please publicise the availability of these additional words.

David R Innes
Avon

Well done to Watford and Computer Concepts for including the prefixes to reduce ROM clashes like this. Obviously, where a prefix is provided, it should be clearly documented.

NO LONGER THE TOPS

Sir, Please could you give a good reason for the disappearance of the Top 20 BBC and Top 10 Electron games from *Acorn User*?

Surely it wouldn't be too much to ask to have the charts, perhaps every other month? They were one of my favourite features of your excellent magazine. Why did they go?

Ben Martin
East Sussex

The software charts were dropped partly because we felt the education and business charts were of limited value, partly because of lack of space. The Games Page has replaced them, and does comment on the popularity of new releases.

PRICES DOWN!



SCHOOL ORDERS WELCOME

large (100 disk capacity) *lockable* disk storage 5¼" box worth £13.95 –

FREE

OR – When you buy 25 disks for only £18.75* including postage and VAT!

FREE (MOSTLY!)



Choose any one of the following hits (on disk) paying only the price in brackets:- *Chollo (£5), Grand Prix Construction Set (FREE), Codename Droid (FREE), Ravenskull (FREE), Thrust (FREE), Repton 3 (FREE), Around the World in 40 Screens (FREE), Strykers Run (FREE), Elite (£3), Revs 4 Track (£3), Phanton (£1), Superior Collection 1/2 (FREE), Paperboy (£3), Big K.O. (£1), Sphere of Destiny (FREE), Colossus Chess (£3), Mini Office II (£5). Phone for Others.*

ALL DISKS ARE JAPANESE – When you buy 25 disks for only £18.75* including postage and VAT!

FUJI

96 TPI CERTIFIED BULK PACKED

* *N.B. All disks supplied are superior quality Fuji double density 5¼" DS disks which are ideal for both 40 & 80 track drives. Add 10% if you want Quad density disks. Subtract 5% if you want single sided disks. They include envelopes, hub rings, labels etc.*

FREE

3½" 90 Capacity lockable disk box for 3½" disks – when you buy 15 DS 135 tpi high quality 3½" disks for only £26.95 (inc. Post & VAT!)

ONE PER CUSTOMER

FREE



LATEST Solar Powered Credit Card Calculator (Worth £12.50) when you buy 25 disks for only £18.75*

Quantity prices for 5¼" disks (Fuji)

(All 96 tpi DD/DS)

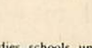
50 – £24.00
100 – £45.00
200 – £85.00

Includes VAT + Post!
+ 10% for quad density
– 5% for Single Sided
* Lockable box above only £4.96 * when purchased with above quantities of disks.

nebulae

Nebulae, Dept MH, FREEPOST, Kilroot Park Industrial Estate, Carrickfergus, Co Antrim, BT38 7BR TEL (09603) 65020 (Mon-Fri 9 to 5)

7 Day Delivery. One year guarantee & 14 day money back period





ORDER BY PHONE FOR SAME DAY DESPATCH

We accept orders from all government bodies, schools, universities, PLC's etc. We despatch on receipt of an official purchase order.

FREEPOST YOUR ORDER TODAY – NO STAMP REQUIRED

GAMES GALORE
LOWEST PRICES IN THE U.K.

BBC CASSETTE

SOFTWARE HOUSE	TITLE	RRP	OUR PRICE
Activision	Firetrack	9.99	7.80
Acornsoft	Countdown To Doom	9.95	7.75
	JCB Digger	9.95	7.75
Arcana	Power Play	9.95	7.75
Beau Jolly	Computer Hits 5	6.95	5.40
	Computer Hits 10	9.95	7.75
	Computer Hits 10 V2	9.95	7.75
	Computer Hits 10 V3	9.95	7.75
	5 Star Games	9.95	7.75
	5 Star Games Vol 2	9.95	7.75
Bubble Bus	Starquake	9.95	7.75
C D S	S. Davis Snooker	8.95	7.00
Domark	Trivial Pursuit	14.95	11.65
	Trivial Pursuit (Young Player)	14.95	11.65
	Trivial Pursuit (Baby Boomers)	14.95	11.65
	Baby Boomers Add-On Questions	7.95	6.20
Elite	Airwolf	9.95	7.75
	Commando	9.95	7.75
	Paperboy	9.95	7.75
Firebird	Sentinel	9.95	7.75
Imagine	Yie Kung Fu II	8.95	7.00
Infogrames	Apocalypse	9.95	7.75
Leisure	Cluedo	12.95	10.10
Genius	Monopoly	12.95	10.10
	Scrabble	12.95	10.10
Level 9	Colossal Adventure	9.99	7.80
	Price Of Magick	9.95	7.75
Logotron	XOR	9.95	7.75
Melbourne House	Lord Of The Rings	15.95	12.45
	Hobbit	9.95	7.75
	Exploding Fist	9.95	7.75
Micropower	Dr Who	18.95	14.80
	Imogen	8.95	7.00
	Power Pack	9.95	7.75
	Micropower Magic	7.95	6.20
	Micropower Magic 2	7.95	6.20
Ocean	All Star Hits	9.95	7.75
	D Thomson S Test	8.95	7.00
	Konami Coin-Op Hits	9.95	7.75
Prism	Football Manager	8.95	7.00
Superior	Acornsoft Hits 1	9.95	7.75
	Acornsoft Hits 2	9.95	7.75
	Collection Vol 1	9.95	7.75
	Collection Vol 2	9.99	7.80
	Citadel	9.95	7.75
	Elite	12.95	10.10
	Galaforce	9.95	7.75
	Grand Prix Con Set	9.95	7.75
	Karate Combat	8.95	7.00
	Ravenskull	9.95	7.75
	Codename Droid	9.95	7.75
	Repton III	9.95	7.75
	Strykers Run	9.95	7.75
Tynesoft	European Games	7.95	6.20
U.S. Gold	Crystal Castles	9.99	7.80
	Fantastic Four Pt1	9.95	7.75
	Kayleth	9.95	7.75
	Master Of Universe	9.99	7.80
	Raid Over Moscow	9.99	7.80
	Temple Of Terror	7.99	6.25
Virgin	Growing Pains Of Adrian Mole	9.95	7.75

BBC DISC

SOFTWARE HOUSE	TITLE	RRP	OUR PRICE
Activision	Firetrack	14.99	11.70
Audiogenic	Psycastria	11.95	9.30
	Sphere Of Destiny	11.95	9.30
	Thunderstruck 2	11.95	9.30
Arcana	Powerplay	14.95	11.65
Argus	Dunjunz	7.95	6.20
Beau Jolly	Computer Hits Vol2	14.95	11.65
Bubble Bus	Starquake	11.95	9.30
C D S	Blue Ribbon II	9.95	7.75
	Collosus Chess 4	14.95	11.65
	Football Fortunes	17.95	14.00
	S Davis Snooker	12.95	10.10
Domark	Trivial Pursuit	19.95	15.55
	Trivial Pursuit (Young Players)	19.95	15.55
Elite	Airwolf	14.95	11.65
	Commando	14.95	11.65
	Paperboy	14.95	11.65
Firebird	Sentinal	14.95	11.65
Gremlin	Footballer Of Year	14.95	11.65
Imagine	Yie Ar Kung Fu II	12.95	10.10
Incentive	Moon Cresta	9.95	7.75
	The Kel Trilogy	11.95	9.30
Infogrames	Apocalypse	14.95	11.65
Leisure	Monopoly	14.95	11.65
Genius	Scrabble	14.95	11.65
Logotron	XOR	12.95	10.10
	XOR Designer	14.95	11.65
Martech	S Fox Strip Poker	12.95	10.10
	Tarzan	12.95	10.10
Melbourne House	Hobbit	17.95	14.00
	Lord Of The Rings	19.95	15.55
	Exploding Fist	14.95	11.65
Micropower	Dr Who	19.95	15.55
	Imogen 40 Track	9.95	7.75
	Imogen 80 Track	9.95	7.75
	Micropower Magic	9.95	7.75
	Micropower Magic 2	7.95	6.20
Mirrorsoft	Strike Force Harrier	12.95	10.10
	Know Your Own Personality	12.95	10.10
Ocean	D Thomson S Test	12.95	10.10
Superior	Acornsoft Hits 1	11.95	9.30
	Acornsoft Hits 2	11.95	9.30
	Collection Vol 1	11.95	9.30
	Collection Vol 2	11.95	9.30
	Citadel	11.95	9.30
	Deathstar Interceptor	11.95	9.30
	Elite	14.95	11.65
	Galaforce	10.95	8.55
	Grand Prix Con Set	11.95	9.30
Superior	Ravenskull	11.95	9.30
	Codename Droid	11.95	9.30
	Repton III	14.95	11.65
	Strykers Run	11.95	9.30
	Thrust!	11.95	9.30
Tynesoft	Big K.O.	12.95	10.10
	Phantom	12.95	10.10
U.S. Gold	Crystal Castles	14.99	11.70
	Impossible Mission	14.95	11.65
	Kayleth	14.95	11.65
	Master Of Universe	14.99	11.70
	Temple Of Terror	13.00	10.15

ELECTRON

SOFTWARE HOUSE	TITLE	RRP	OUR PRICE
Audiogenic	Power Pack	9.95	7.75
Beau Jolly	Computer Hits 3	9.95	7.75
	Computer Hits 5	6.95	5.40
	Computer Hits 10	9.95	7.75
	Computer Hits 10 V2	9.95	7.75
	5 Star Games	9.95	7.75
	5 Star Games Vol 2	9.95	7.75
C D S	Steve Davis Snooker	8.95	7.00
Elite	Paperboy	9.95	7.75
Imagine	Mikie	8.95	7.00
	Yie Ar Kung Fu	9.95	7.75
Melbourne House	Way Of The Exploding Fist	9.95	7.75
Micropower	Micropower Magic	7.95	6.20
	Micropower Magic 2	7.95	6.20
Logotron	XOR	9.95	7.75
Superior	Acornsoft Hits 1	9.95	7.75
	Acornsoft Hits 2	9.95	7.75
	Collection Vol 3	9.95	7.75
	Citadel	9.95	7.75
	Elite	12.95	10.10
	Galaforce	9.95	7.75
	Ravenskull	9.95	7.75
	Repton II	9.95	7.75
	Repton II	9.95	7.75
	Repton III	9.95	7.75
Tynesoft	Commonwealth Games	6.95	5.40
U.S. Gold	Crystal Castles	9.99	7.80
	Fantastic Four Pt1	7.95	6.20
	Kayleth	7.99	6.25

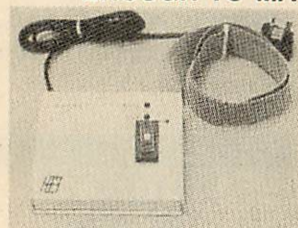
BBC DISC 3.5"

SOFTWARE HOUSE	TITLE	RRP	OUR PRICE
Audiogenic	Thunderstruck 2	11.95	9.30
C D S	Birdie Barrage Golf	12.95	10.10
	B Ribbon Games 1	12.95	10.10
	B Ribbon Games 2	12.95	10.10
	S Davis Snooker	12.95	10.10
Micropower	Imogen	11.95	9.30
	Micropower Magic	9.95	7.75
	Micropower Magic 2	9.95	7.75
Superior	Acornsoft Hits 1	14.95	11.65
	Acornsoft Hits 2	14.95	11.65
	Collection Vol 1	14.95	11.65
	Collection Vol 2	14.95	11.65
	Elite	19.95	15.55
	Grand Prix Con Set	14.95	11.65
	Revs + 4	19.95	15.55
	Repton III	14.95	11.65
	Strykers Run	14.95	11.65
Tynesoft	Phantom	12.95	10.10

ORDER BY PHONE (096 03) 65020
or BY MAIL TO ADDRESS OPPOSITE

* **SPECIAL OFFER:-** Buy 25 blank disks (5¼" ds/dd 96 tpi Fuji) for **£18.75** and deduct **£11.95** *from the R.R.P. price* of any of the above disk programs; ie for 25 disks & Codename Droid-send just **£18.75** for 25 disks & Sentinel – send just £21.75 (£18.75 + £3)

AT LAST AN EPROM PROGRAMMER POWERFUL ENOUGH TO MATCH THE MASTER



The new MICRON 64K PLUS is now launched. NO OTHER EPROM PROGRAMMER can match the specifications yet it costs less than the competitors which offer far less. THE MICRON 64K PLUS runs on ANY VERSION of the BBC FITTED WITH A 1.2 OPERATING SYSTEM OR GREATER, VERY SIMPLE to use with no switches to select. Two leds indicating power and programming are situated on the front panel. Plugs into 1MHz bus.

ATTRACTIVELY CASED IN CUSTOM BUILT SLOPING METAL BOX AND SPRAYED IN BBC MATCHING COLOURS.

THE SPECIFICATIONS:

* FULLY MENU DRIVEN.
* WILL PROGRAMME 2716, 2732, 2764, 27128, 27256, 2532, 2564, 27512, 27513, 2516, ie MOST DEVICES 2K to 64K, 2732A, 2764, etc . . .
* PROGRAMS ALL EPROMS 32K OR LESS IN A SINGLE PASS.
* FULLY BUFFERED.
* SOFTWARE SELECTABLE PROGRAMMING VOLTAGE 12.5/12/25.
* NORMAL OR HIGH SPEED ALGORITHMIC METHOD CAN BE USED ON ALL EPROMS 8K, 16K, 32K, 64K (SOFTWARE SELECTED).
* ZIF SOCKET POWERED DOWN WHEN NOT IN OPERATION.
* MAINS DERIVED SELF CONTAINED POWER SUPPLY.
* VCC IS RAISED TO 6V DURING PROGRAMMING IN LINE WITH MANUFACTURERS RECOMMENDATIONS.
* MAINS DERIVED SELF CONTAINED POWER SUPPLY.

SOFTWARE SUPPLIED ON EPROM IS MENU-DRIVEN INCLUDING THE FOLLOWING ROUTINES.

* AUTOMATIC VERIFICATION ON COMPLETION OF PROGRAMMING AND FAULT LISTING.
* BUILT IN FULL-SCREEN MEMORY EDITOR (BUFFER IS 32K LONG).
* SOFTWARE ALLOWS BLANK CHECK ON EPROM & AUTOMATICALLY LISTS FAULTS.
* WILL COPY EPROMS TO BUFFER OR TO FILE.
* WILL GENERATE CHECKSUM.
* BBC FORMAT ROM IMAGES MAY BE CREATED USING A NUMBER OF BASIC OR MACHINE CODE PROGRAMS UP TO THE CAPACITY OF THE SELECTED ROM. MORE THAN ONE PROGRAM CAN BE STORED ON ONE EPROM.

PRICE ONLY £68.00 + £10.20 VAT + £3.00 P&P.

ORDERS TO:

H.C.R. ELECTRONICS,
H.C.R. HOUSE, BAKERS LANE, INGATESTONE
ESSEX CM4 0BZ. Tel (0277) 355407/8



Understanding INTER-WORD

INTER-WORD is an advanced word processing package for the BBC Micro range of computers. The primary aim of this book is to provide self-contained sections covering each of the important facilities. Aided by approximately 100 illustrative diagrams, the information is conveyed simply but concisely:

Some of the topics covered include:-

• Starting from scratch • Edit mode • Pull-down menus • Text layout • Marked sections • Printing • Saving and loading • Multi-file • Long documents • Search & Replace • Spell-Master • Shadow & Sideways RAM • Comprehensive index • Glossary of terms

Price £6.50

postage free.

Please send your cheque or postal order, made out to:

Arlon House Publishing

Arlon House,
Station Road,
Kings Langley,
Herts WD4 8LF
Tel: (09277) 68328

Official Orders Accepted Trade Enquiries Welcome.

ISBN 0-946273-03-0

Understanding INTER-WORD Beginner's Guide

By Rob Pickering





HINTS & TIPS

Martin Phillips sorts out computer mathematics, banishes the boring beep and straightens out circular graphics

EQUALITY OR NOT?

You would assume that the computer is good at mathematics. In reality it is pretty hopeless. This program illustrates the point rather well.

```
10 REM Listing 1
20 A=5.2
30 B=5
40 C=10.2
50 IF A+B=C  THEN PRI
NT "Right"
60 IF A+B<>C THEN PRI
NT "Wrong"
```

The program will, of course, print out the expected answer 'Right'. If, however, lines 20 and 40 are changed to read:

```
20 A=5.4
40 C=10.4
```

and the program run again, the answer 'Wrong' will be given. From the first attempt at running the program, we know that the program is working correctly. The mistake lies in the way the computer does its maths. On typing the following lines directly into the computer, these results are obtained:

```
PRINT A
     5.4
PRINT B
       5
PRINT C
    10.4
PRINT A+B-C
3.7252903E-9
```

Now the problem becomes clearer. A+B−C does not equal zero, but 0.0000000037252903. This difference, slight though it is, is enough to stop the equality statement working. The difference is caused by the way the computer stores numbers. To be more precise, it is not the computer, but the way Basic stores numbers. These are only stored to 10 places of decimals (nine with Basic 1). Other computer languages such as Fortran can work to a far greater accuracy than Basic allows, but the problem will still exist. The way round this is quite simple to demonstrate:

```
10 REM Listing 2
20 A=5.4
30 B=5
40 C=10.4
50 IF A+B-C<0.001 THE
N PRINT "Right"
60 IF A+B-C>0.001 THE
N PRINT "Wrong"
```

It's important to realise that this problem only occurs with real numbers – integers are always stored exactly.

Often a program with such a test for equality of real numbers will work reliably for ages, then suddenly go wrong when it hits a bad combination of numbers.

One example when this problem will rear its ugly head is when writing programs to handle money. If there are any checks, say on the total, then these might not agree. There are two possible cures for this. The first is to multiply the real numbers by 100 and work in integer arithmetic. To display the results divide them by 100. Listing 3 on the yellow pages gives an illustration of this method. Using the print format variable @%, the figures are printed out to two decimal places. By using integer arithmetic it is possible to store values up to £2,000,000 accurate to the nearest penny.

This method as it stands is not foolproof, as real numbers still have to be used for input and output. Try adding £29.49 and £10. To get around this, instead of multiplying and dividing by 100, change the program to multiply and divide by 1000. This means that the real number is converted with a ten-fold greater accuracy, although the maximum value it is possible to store will be reduced by 10 times.

The other cure is to use a relative test rather than trying to equate two totals exactly. As any value less than £0.01 has no significance in our monetary system, we can utilise this to provide a better test for totals agreeing: listing 4 shows how this can be done. The ABS statement ensures that the test will work whichever total is larger. Essentially the check finds out whether the difference between the two values is small enough to ignore.

£5

SIDEWAYS RAM LOADER

Stephen Baxter from Milton Keynes wins £5 for sending in a routine to load a ROM image from disc into any sideways RAM present (yellow pages, listing 5). When the program has been typed in and run, it will save a short machine-code program called 'RAM'. This should be saved onto a disc with the ROM images sorted on it. Then to load a ROM in from disc, type:

*RAM ‹filename›

When the ROM has loaded, the computer will make a beeping sound and wait for you to press a key. When a key is then pressed, the program will perform a hard break, clearing memory and resetting the machine, and initialising the ROM image. To avoid this hard reset, press Break instead of another key.

This program won't work properly if a second processor is attached though, because the 'hard break' can't be fully emulated in software. With a second processor, press Break instead of any other key when the machine beeps. This will also be necessary when the sideways ROM image loaded needs to claim work space, like most filing systems and some utility ROMs. These are the ROMs that make the value of PAGE increase – try PRINT PAGE before loading in the ROM, then load it, press CTRL-Break and PRINT PAGE again to find out. If the two values differ, then the ROM requires work space.

When the Break key is pressed to install the ROM, it sends a Reset signal to the 6502 processor chip. This chip then looks at locations &FFFC and &FFFD to find the address of the initialisation routine. The 6502 then jumps to this initialisation routine and resets most of the major functions of the computer. This procedure includes a check to see which ROMs are installed.

The operating system keeps a table of information about each ROM, and allocates each some memory if the ROM requires it. Loading a new ROM image into sideways RAM means the table needs to be updated, and this is just what the &FFFC routine does.

PINEAPPLE SOFTWARE

Programs for BBC computers with disc drive. FREE updating service on all software.

DIAGRAM

Still the only drawing program available for the BBC micro which gives you the ability to draw really large diagrams and scroll them smoothly around the screen stopping to edit them at any time if required.

Pineapple's unique method of storing the diagram information on disc means that the size of diagrams is limited only by the free space on disc, and not the amount of computer memory you have available. (A blank 80 track disc will allow up to 39 mode 0 screens of diagram).

The superb print routines supplied with the program enable large areas of the diagram to be printed in a single print run in a number of different sizes and rotated through 90 deg. if required. Full use can also be made of printers which have a wider than normal carriage available.

The program is fully compatible with the Marconi Tracker ball described below.

PLEASE STATE 40 or 80 TRACK DISC & WHETHER STANDARD BBC or MASTER VERSION IS REQUIRED

PRICE £25.00 + VAT

DIAGRAM UTILITIES

A suite of six utility programs which add additional features to the 'Diagram' drawing program. The utilities include the saving and loading of areas of diagram to and from disc. The ability to display the whole of your large diagram on the screen at one time (in either 4★4 or 8★8 screen format). The addition of borders and screen indents to diagrams, and the ability to shift a whole diagram in any direction.

PRICE £10.00 + VAT

MARCONI TRACKER BALL

This high quality device comes with it's own Icon Artmaster drawing program and utilities to enable it to be used in place of keyboard keys, joysticks, or with your own programs.

For Model B & B+ (with Icon Artmaster)	£60.00 + VAT	Bare Trackerball (no software)	£49.00 + VAT
For Master Series (with Pointer ROM)	£60.00 + VAT	Pointer ROM available separately	£12.50 + VAT
	P&P on Trackerballs	£1.75	

ADFS Utilities ROM

ADU is a new product which will prove invaluable to all users of the ADFS. (Including Winchester owners).

The ADU Rom allows direct access to utilities which previously required the use of the ADFS utilities disc.

Many novel features are included in the commands allowing such facilities as the copying of all the files on a DFS disc onto ADFS in a single pass and Backing up between discs of different size (including Winchesters).

There is also a very powerful sector editor with automatic correction of CRC bytes and a menu routine with over 30 possible operations on ADFS discs.

Please write or 'phone for more details.

PRICE £29.00 + VAT

PCB

This new release from Pineapple is a printed circuit board draughting aid which is aimed at producing complex double sided PCB's very rapidly using a standard BBC micro and any FX compatible dot-matrix printer.

The program is supplied on EPROM and will run with any 32k BBC micro (including Master series). Also supplied is a disc containing a sample PCB layout to demonstrate the programs features.

By using an EPROM for the program code the maximum amount of RAM is available for storing component location and ASCII identification files etc. (Up to 500 components and 500 ASCII component descriptions may be stored for a given layout). These is no limit to the number of tracks for a given PCB, although the maximum size of board is restricted to 8" * 5.6".

Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers entered on this screen may be displayed during track routing to aid identification of roundels.

The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 or 2:1 scale, enabling direct contact printing to be used on resist covered copper clad board.

This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample prinouts.

PRICE £85.00 + VAT

TRACKERBALL ADAPTORS

Converter leads to enable the Trackerball to run mouse software and the mouse to run trackerball software (inc. DIAGRAM). Please state which way round when ordering.

PRICE £8.00 + VAT

MITEYSPICE

A new addition to our range of engineering software. Miteyspice is a very powerful DC and AC analogue circuit simulator package with graphic display for any model BBC computer.

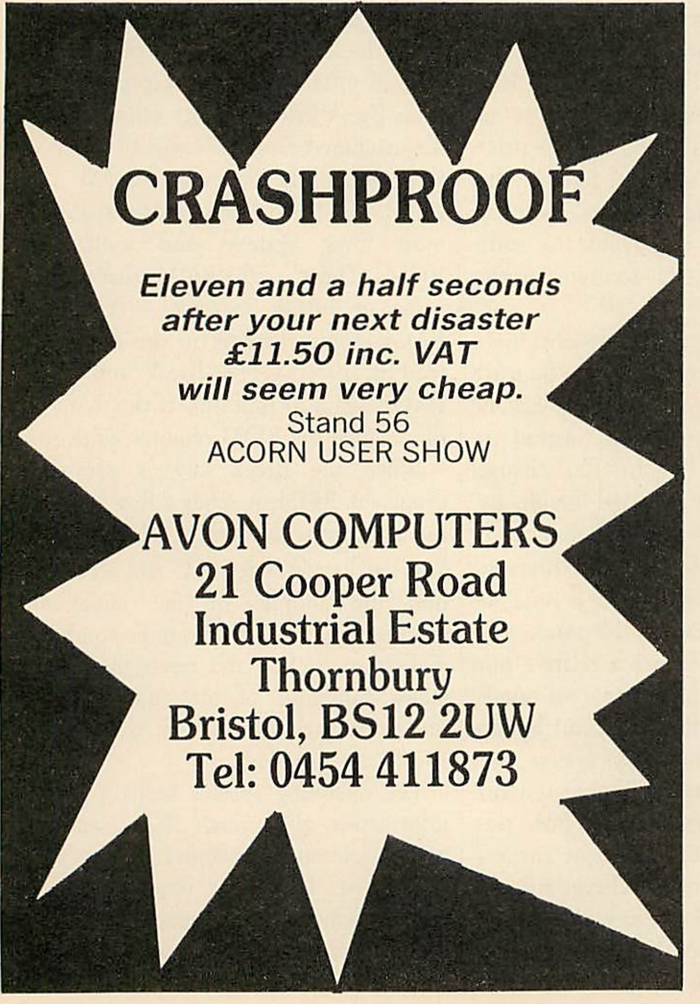
As well as all the usual facilities available with this type of program, non-linear effects, small signal, noise measurements and sweeps may be performed. Component values may be swept, allowing component tolerances to be investigated as well as thermal performance etc. Comprehensive transistor modelling is incorporated using a 20 parameter Ebers Moll description. The program is supplied on disc with a very comprehensive 49 page manual.

Please write or 'phone for more information.

PRICE £119 + VAT P&P FREE

ALL ORDERS SENT BY RETURN OF POST

VISA 39 Brownlea Gardens, Seven Kings, Ilford, Essex 1G3 9NL. ☎ Tel: 01-599 1476





Choosing AV, video or microcomputer equipment? Is it suitable for your needs?

TEST Bureau Technical Reports

TEST Bureau's Reports on AV, video and microcomputer equipment give frank and candid advice and information. Many education authorities subscribe and receive the regular report issues.

TEST Bureau's purpose is to improve equipment on the market. It satisfies this purpose by testing and reporting the findings which cover safety, performance and usability.

Now, you can buy individual reports; write for a price list of reports produced over the last few years. Some recent examples from the list are:

Acorn Archimedes microcomputer,	£5.00
Acorn/BBC Master 128 microcomputer,	£5.00
Acorn/BBC Master Compact microcomputer,	£5.00
Plotmate A4M plotter,	£2.50
Viglen VB20MB hard disc unit,	£2.50
Citizen 120-D printer,	£4.00
Star NL-10 printer,	£4.00
Zenith ZVM1230 green-screen monitor,	£2.00

Send cash with order (prices include postage) to TEST Bureau, Vauxhall School, Vauxhall Street, London SE11 5LG.

(Cheques payable to TEST Bureau).

BANISH THE BORING BEEP

The easiest way to produce a sound on the BBC, and also the least well documented, is to hold down the CTRL key and press the letter G. This is normally written as CTRL-G. The computer will produce a beep. Every time CTRL-G is pressed the familiar computer beep will sound. This beep can also be used in programs; pressing CTRL-G produces ASCII code 7. ASCII stands for American Standard Code for Information Interchange. The seven and the G are related, G being the seventh letter of the alphabet. BBC Basic has two methods of enabling ASCII codes to be used in programs. The first is CHR$. A program could have:

```
PRINT CHR$(7)
```

This produces the same sound as CTRL-G. Also there is the VDU command. Typing VDU 7 followed by Return will produce the same beep. If just a simple beep is required, say to indicate a key has been pressed in a program, the VDU command is easier to use than the more complicated SOUND keyword. To produce a longer beep several VDU7s can be strung together. The VDU statement only needs to be included once.

```
VDU 7,7,7,7
```

This is the same as:

```
PRINT CHR$(7),CHR$(7),CH
R$(7),CHR$(7)
```

Incidentally, the commas and the brackets are not needed in the PRINT statement, but they are useful for clarity. It can be seen that the VDU statement is very much more concise than the PRINT CHR$ (7) statement and achieves much the same result.

In a program it is often useful to give an audible prompt when a response is required. CHR$(7) can be included to achieve this.

```
   10 PRINT CHR$(7)"Plea
se enter your name"
   20 INPUT name$
   30 PRINT "Hello "name
$
```

Line 10 will sound a beep before printing the request. Line 20 inputs a name into the string variable name$, and line 30 prints out 'Hello' followed by the name.

This beep can be made more interesting. As with so many of the BBC's functions, there are ways of modifying the beep. The following *FX calls are connected with the sound system.

*FX210, X – Change sound suppression. Any value other than 0 for X will disable the sound.

*FX211, X – Set channel used for CTRL-G. The default channel is 3.

*FX212, X – Set envelope used for CTRL-G. The default amplitude is –13; no envelope is set.

*FX213, X – Set pitch used for CTRL-G. The default is 100.

*FX214, X – Duration of CTRL-G tone. The default is six-tenths of a second.

The default settings are those set when the computer is switched on. The pitch is the frequency of the note, and its value can be anywhere between zero and 255. The BBC micro's sound generator seems to have been designed by a piccolo player rather than by a double-bass player, because the value four produces the note C one octave below middle C, and steps of four gives steps of one semitone in pitch. As the highest value that can be entered is 255, the BBC micro will cover a range of just over five octaves.

The range of values for the duration is also zero to 255. Zero for the shortest duration, 254 for the longest. If the value 255 is used, the note will continue indefinitely. A value of zero gives a note which lasts for one two-hundredth of a second. Typing
*FX214,0
and then pressing CTRL-G will produce no audible sound unless the CTRL-G keys are held down, when a rattle from the speaker will be heard. Other values in the range one to 254 give durations measured in twentieths of a second. A value of 10, for example, would give a duration of ten-twentieths of a second, that is, half a second. To produce a note of pitch equal to middle C one second long, enter the following two *FX calls:

*FX213,52
*FX214,20

Now press CTRL-G to hear the sound.

*FX212 is a complicated call but at its simplest, it can set the envelope number. Values between -128 and -240 control the value of the normal beep. Values of 0 or above indicate an envelope should be used, so 0 indicates envelope 1, 8 indicates envelope 2, 16 for envelope 3 and so on.

To test some of the possibilities for sounds using the ENVELOPE statement and the *FX calls try the following:

```
   10 ENVELOPE 1,3,1,-1,
1,1,2,1,75,0,0,-75,126,1
26
   20 *FX212,0
   30 *FX213,200
   40 *FX214,10
```

Run this program. Nothing should happen until CTRL-G is pressed. The sound makes a change from the normal beep! *FX212,0 sets the CTRL-G to take note of envelope 1. *FX213 alters the pitch to 200, and *FX214,10 sets the duration to ten twentieths of a second. Try changing line 30 to:

```
   30 *FX213,0
```

How about a car-crash sound?

```
   10 ENVELOPE 2,1,0,0,0
,0,0,0,127,-1,-1,-1,126,
0
   20 *FX212,8
   30 *FX213,5
   40 *FX214,20
   50 *FX211,0
```

Before trying the next example, press CTRL-Break to reset the *FX calls.

```
   10 ENVELOPE 1,2,1,1,1
,100,100,100,63,-10,0,-6
3,63,100
   20 *FX212,0
   30 *FX214,30
```

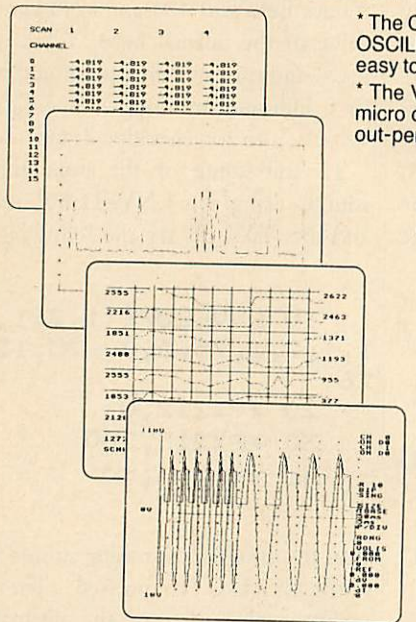
And finally, for a pleasant beep:

```
   10 ENVELOPE 1,1,0,0,0
,0,0,0,80,-2,-4,-8,126,0
   20 *FX212,0
   30 *FX213,128
   40 *FX214,16
```

Run this program, and the beep will be set up until you next press Break or change the envelopes used.

Oasis Products

OASIS VIRTUAL INSTRUMENT SYSTEM



* The OASIS Virtual Instrument System (VIS) emulates conventional DVM, OSCILLOSCOPE, CHART RECORDER, X/Y PLOTTER and DATA LOGGER in one easy to use package and also provides sophisticated data analysis tools.

* The VIS data acquisition module and instrument emulation software turns the BBC micro directly into a versatile and flexible laboratory measurement system which can out-perform and is easier to implement than IEEE 488 linked systems.

* VIS professional, ready-to-use instrument emulations include:
Multi-channel DVM with real time numeric and graphic displays, storage SCOPE with on-screen measurement and waveform zoom, DATA LOGGER with logged data compression algorithm and X/Y PLOTTER with programmable integration periods.

HARDWARE

VIS is based on a precision computer controlled 16 channel A-D converter, with six programmable ranges and read rates of 50k samples per second at 8 bit resolution, 25k at 12 bit.

This simply installed unit has proven long term stability and reliability.

SOFTWARE

The menu-driven acquisition, analysis and display programs combine on screen set up of measurement parameters, SPREADSHEET data manipulation and a range of data display formats, including 8 trace CHART RECORDER and oscillogram.

Total data mobility from measured information to memory, disk, screen and HARD COPY output.

The OASIS VIS carries full documentation to allow the beginner or professional programmer to create new interface applications or personalised instrument emulations.

PRICE

At £399 (ex VAT), the price of the complete VIS system is less than any one of the instruments it replaces. Performance enhanced versions also available, e.g. higher acquisition speeds.

For fast delivery, phone your order on 0603 747887. Technical queries answered and requests for further data on this number.

The Street, Old Costessey, Norwich NR8 5DF Tel: 0603 747887

Design Consultancy

SUBSCRIPTIONS

ACORN USER OFFER

Subscribe now!–and we will send you a FREE Disc Help Disc

If you have enjoyed this issue of *Acorn User*, the biggest and best-selling BBC micro/Acorn magazine, why not guarantee you receive your monthly copy by taking advantage of our super subscription offer? When you subscribe at the annual price of only £17.50, we'll send you our *Disc Help Disc* absolutely free (UK subscribers only).

By simply inserting the *Disc Help Disc*, all your disc problems will be solved. It covers all aspects of file maintenance and the disc filing simulator allows you to practise using the commands without risking any of your valuable programs. The disc is only available in 80-track format.

Overseas subscribers can take advantage of our two-year rate offer, 27 issues for the price of 24. Order form on page 129.

For those who want the *Disc Help Disc* but already subscribe, the disc is available by using the order form on page 130.

YES! Please start my *Acorn User* magazine subscription from the ______ issue and send me my FREE *Disc Help Disc*.

NAME

ADDRESS

POSTCODE

☐ I enclose my cheque/postal order for £17.50 made payable to Redwood Publishing ☐ Please debit £17.50 from my Access/Barclaycard/American Express

Account No: Expiry Date

SIGNED DATE

Send this coupon with your remittance in an envelope to Gail Fairhall, Subscriptions Manager, Redwood Publishing Limited, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.

FOOD FOR THOUGHT

Carl Bateman from Stoke-on-Trent writes: 'So, *you need* ESC '*' codes and proportional graphics modes to dump round circles do you? Well, this screen dump uses only the standard double density graphics mode (See figure 1).

'It's true that the usual graphics modes that can be accessed give you ratios of 60:72, 120:72 and 240:72. None of these give round circles, but the odd ratio can easily be compensated for by using smaller steps when using the POINT command.'

There are three points raised by Carl's letter. The first point concerns the printing of circles. Here the aim is to print out in the same proportions as the screen, as well as faithfully reproducing the exact layout. Many screen dumps accurately reproduce all the screen pixels, but print a picture which is out of proportion. This effect is most easily observed by drawing circles; they appear as ellipses.

Carl's idea of altering the ratios within the program to give true circles is a good one, but it does have a disadvantage. This is illustrated in the screen dump he included in his letter. By a careful examination of the left-hand vertical lines of the squares in figure 1, a difference of thickness can be observed. This is more noticeable on a large printout than on a small one. It is due to the screen dump occasionally skipping a screen point in order to get the proportions right. Such a screen dump has to include a loop of the type:

```
FOR X=0 TO 1279 STEP 2.4
...
...
NEXT X
```

The step of 2.4 in the X direction corrects the proportions of the image but then creates another problem. The screen dump will not reproduce each screen pixel.

Inside this FOR. . .NEXT loop there is a POINT test. This checks whether the screen pixel at the point given by X and Y is 'set', ie, lit. This POINT statement handles only integers; if X or Y is a fraction, it is rounded down to the nearest multiple of four (in mode 1). This causes a problem – X goes up 0, 2.4, 4.8, 7.2, 9.6, 12.0, 14.4, and so the rounded figures are 0, 0, 4, 4, 8, 12, 12. Note that 8 isn't repeated, so the screen dump only looks at that point once. But it looks at all the others twice. Therefore some vertical lines will appear thinner on the printout, although the overall screen proportions are faithfully reproduced. Thus this does not give a true proportional screen dump. Compare the text in figure 1 with the proportional dump of the same size: there's no variation in the vertical lines.

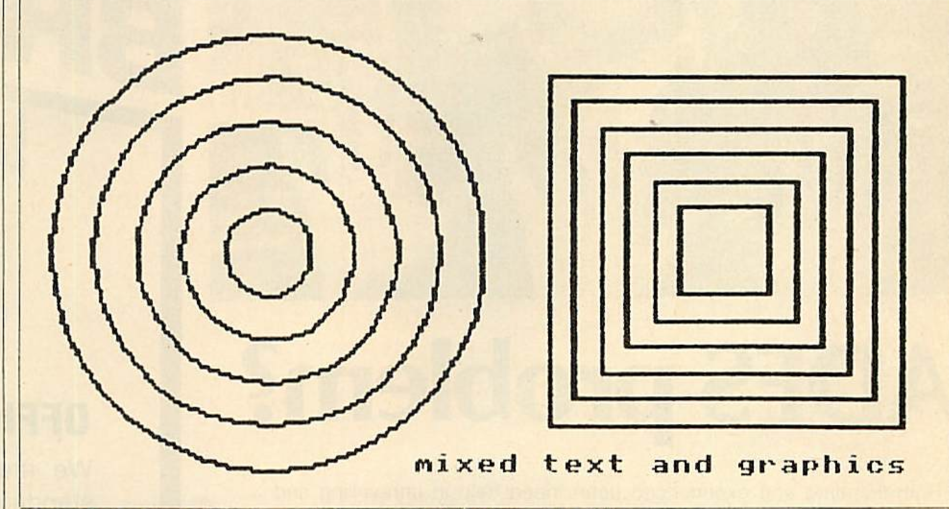


Figure 1. Reader Carl Bateman's dump: note that the vertical lines vary

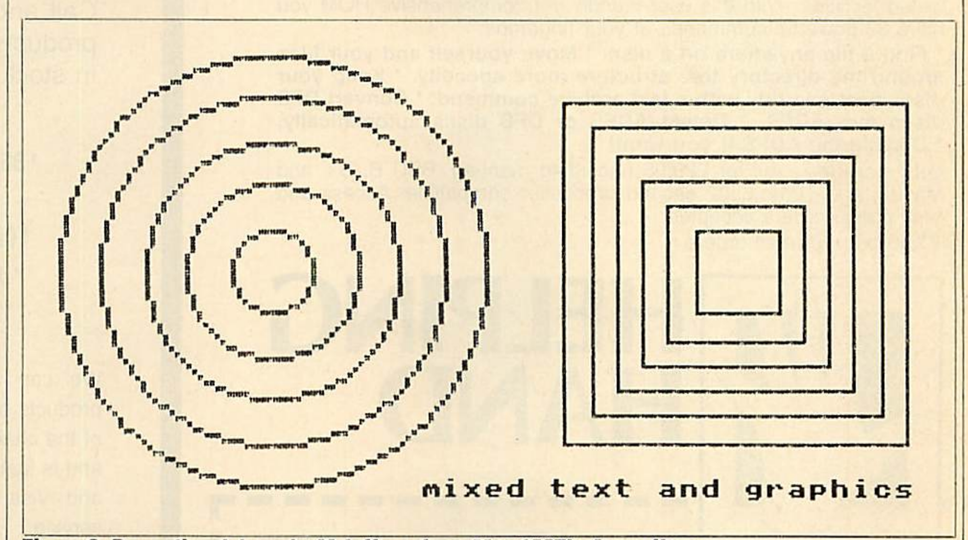


Figure 2. Proportional dump by M Jeffree, from May 1987's *Acorn User*

£5

ARIES B32 TIP

Mr Beeston from Enfield wins himself another fiver for a simple but effective tip. You can turn off your Aries B32 from within a program with '*XOFF 2'. But this causes a 'Bad command' error on a machine without an Aries B32. The solution is to 'trap' the error, and allow the program to continue. A simple way is as follows:

```
  10 ON ERROR GOTO 100
  20 *XOFF 2
  30 REM .... rest of p
rogram
  100 IF ERR=254 AND ERL
=20 THEN GOTO 30
```

This technique is easy to adapt for other similar situations where a command is not applicable – for example trapping *DISC when used on a machine not equipped with a disc drive.

£5

EXTRA WIDE VIEWSHEET

Hardeep Girn of Ilford writes that extremely wide spreadsheets can be printed with *ViewSheet*, if you type: VDU 2, 1, 15, 1, 27, 1, 83, 1, 0, 3 before entering *ViewSheet*. This makes many printers use extra condensed subscript characters.



ADFS problem?

Both first-time and experienced users need help in unravelling and simplifying the complexities of the ADFS. 'Helping Hand' has many commands that will let you make the most of the ADFS's sophisticated facilities. With this user-friendly yet comprehensive ROM you have 33 powerful commands at your fingertips:

*** Find a file anywhere on a disc. * Move yourself and your files around the directory tree structure more speedily. * Keep your discs neat and tidy with a fast archive command. * Convert DFS discs into ADFS. * Detect ADFS or DFS discs automatically. * Disable the ADFS if you want!**

Lots more too – all for £29.95 (including manual). BBC B, B+ and Master, and Turbo/6502 second processor compatible. Access and Visa phone orders accepted.

£1.50 p+p for mail orders



HELPING HAND

THE DATA STORE, 6 CHATTERTON ROAD, BROMLEY, KENT BR2 9QN. 01-460 8991 Please send me a copy of HELPING HAND with manual. I enclose £31.45 (PLEASE PRINT NAME & ADDRESS)

NAME ....

ADDRESS ....

....

POSTCODE .... AU SEPT 87

No 1 in BROMLEY



OFFICIAL ACORN DEALERS

We are official Acorn Dealers with high standards to maintain and we take pride in friendly and efficient advice and service. Call and see our comprehensive range of products – if we don't have what you want in stock, we can get it.

* BBC Master Computers. * Monitors. * Printers.
* Discs and drives. * Mice. * Modems.
* Cables and leads. * Printer ribbons. * Paper.
* Joysticks. * Accessories. * Storage boxes.
* Games. * Books. * Educational software.

We can demonstrate and advise you about the products best suited to your needs – unlike so many of the chain stores. Our Repair Department is on site and is fast and reasonably priced. We accept Access and Visa phone orders and offer a fast delivery service.

Data Store

6 Chatterton Road, Bromley, Kent BR2 9QN. 01-460 8991

Let BEEBAID take the load

The DFS certainly makes accessing files quick and easy.
Beebaid, a powerful 16k ROM, makes using the DFS even quicker and easier by utilising a series of "networked" menus.
Just look at these facilities:

Input commands such as CHAIN LOAD *RUN *ACCESS *LOAD *COPY *DELETE *COMPACT *INFO *DUMP *TYPE and *EXEC by a single key press. Copy selected files from disc to disc. List programs with page mode set. Load machine code programs at the correct address for disassembly. ROM CONTROL & MANAGEMENT – Switch your ROMS on and off, copy them to disc or load ROMS on disc to sideways Ram. DISC INDEX – A comprehensive and easy to use disc index system – find the disc you want easily and quickly. With 44 commands to help you, BEEBAID is a must for all DFS users. Compatible with BBC B, B+ and Master, and Turbo/6502 Second Processor.

Makes using discs easier!

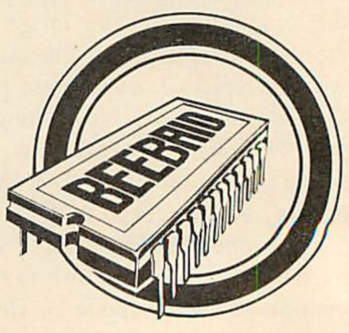
Jaysoft, 114 Kingsway, West Wickham, Kent. BR4 9JQ 01-462 8453
Please send me a copy of BEEBAID with manuals. I enclose £34.

NAME ....

ADDRESS ....

....

POSTCODE .... AU SEPT 87



THE 16K DFS WORKHORSE

FIRST BYTE

USER CALLS

Transferring information into machine code need not be difficult if you follow these easy guidelines

Tessie Revivis

As I have stated in the past, one of the most versatile features of the assembler and Basic built into all the Acorn micros is their inherent ability to be mixed in with one another. Machine code routines can be called at any point in the program and then return back to Basic at a point immediately after they were called. The advantage of this is that you can write the main part of a program in Basic, and intermingle short sections of machine code when speed is of the essence. For example, in a graphics program (which could be to show a screen display or even a game) the core of the program could be in Basic but the screen display could be updated in machine code because that section of the program needs to go as fast as possible.

One of the problems faced in such cases is moving information from the calling Basic program into the machine code routine being called. The most obvious way to do this is to poke the information into a section of memory which the machine code routine knows of; it can then go and get it when it is first called. But this can be a bit messy and extra code is needed – which takes time and memory.

In every program we have used to date we have used the CALL command to set the machine code into motion. At first sight it looks a fairly straightforward command, but it does have the ability to transfer information into the machine code at two levels. The first level is easy and we touched on it briefly several issues ago, but I'll recap.

Whenever you CALL a machine code program, then the lowest bytes of the integer variables A%, X% and Y% are passed into the accumulator and the X and Y registers respectively. Basic's integer variables occupy four bytes of memory each – *only* the low bytes are transferred, which means that you can only move numbers in the range zero to 255 (the maximum for one byte) into the registers. If the variables contain a larger value than 255 then it makes no difference: only the low byte will be transferred, regardless of the total value of the variable.

In addition, the least significant bit of the low byte of the variable C% will be deposited into the carry flag. If C% is odd, then the carry flag will be set; likewise if C% is even, then it will be cleared.

How the process works

Listing 1, on page 51, illustrates very simply how the process works. Enter and run the program. You will then be prompted to enter values for the A, X and Y registers and then the carry flag. The machine code routine (at code%) will then print the ASCII characters that the numbers you have entered represent, so you should only enter numbers in the range 32 to 126. For the carry flag enter a 1 or a 0. The value is then printed, with the machine code testing the carry flag, which was preserved by using PHP to push the status register onto the stack. Later it is pulled back with PLP. Try entering the numbers as follows:

Accumlator	66
X register	66
Y register	67
Carry flag	1

and the response should be BBC1!

Although you have entered a 1 or a 0 in response to the 'carry flag' prompt, you could enter any other value, as it is only the least significant bit that is actually used. For example enter 255 and the carry flag will be set; as 255 is 11111111 in binary, the last bit is set. Similarly entering 254 will clear the carry, as in binary 254 is 11111110.

TABLE 1. PARAMETER TYPES

Code	Type
0	Single-byte, eg, ?Y
4	Four-byte integer variable, eg, B%
5	Five-byte floating point variable, eg, number
&80	A string at a defined address, eg, $&2100
&81	A string variable, eg, C$

While the CALL command can pass values into the processor registers, it cannot pass values back from machine code into Basic. As before, memory locations can be used. However, another function exists that will return a value. This is the USR command. Enter and run listing 2 in the yellow pages, and enter the values 2, 3, 4 and 1 in response to the prompts like this:

```
Accumulator ?2
X Register  ?3
Y Register  ?4
Carry flag (1/0)?1
```

Immediately the result will be returned in the following form:

```
Result:   30060604
```

The value is in hex and it returns the values of the status register, accumulator and two index registers – these are broken down in the following way:

- 30 – Status register
- 06 – Y register
- 06 – X register
- 04 – Accumulator

These numbers represent the status of the registers when the RTS in the machine code returned back to Basic. If we look at the machine code, we can see that on entry (USR also passes values into the registers you'll note) the X register is incremented three times (by INX:INX:INX), the Y register is incremented twice (INY:INY) and the accumulator's contents are doubled by using the ASL A instruction. In the example we passed 2, 3 and 4 into the main registers such that:

A=2 so ASL A = 2*2=4
X=3 so INX:INX:INX = X+3=6
Y=4 so INY:INY = Y+2=6

So we can see from this where the 04, 06 and 06 come from! Although the carry was set

NEW! GENIE Your wish is my command...

The Genie System only £69.00 + VAT (£79.35 inc. VAT plus £1 carriage)

Address Book - Desk Diary — Calculator — Calendar — Phone Book — Notepad.

Instantly — at any time — Magic??? No, just call GENIE!

How often do you interrupt important work on your computer to use a calculator, look up your address book, consult your diary or make a note of something?

Have you ever wished for an invisible helper, just waiting there in the shadows, behind whatever program you are using, ready to appear, as if by magic, whenever needed?

GENIE — YOUR HELPER, HAS ARRIVED!

GENIE is a revolutionary new system which puts all your day-to-day information literally at your fingertips.

A single keystroke will call up GENIE, from WITHIN a wordprocessor, spreadsheet or other application software— no need to save your work—GENIE appears instantly on screen.

When finished, another keystroke makes GENIE vanish, immediately dropping you back to EXACTLY what you were doing, before you called GENIE.

GENIE is a totally self-contained system requiring no access to disk, it is present in your computer from the moment you switch on.

THE SOFTWARE

The GENIE System software—32K of machine code—has an original screen display, using high resolution windows with up to 7 colours on screen, AND 80 column text display. The screen colours are user selectable to give optimum clarity on any monitor.

GENIE provides; a 10 digit calculator with memory, a 100 year calendar, address book, desk diary, notepad and phone book. Information can be accessed by browsing, or by fast search techniques. The notepad is a mini-wordprocessor with word-wrap, and full cursor editing.

GENIE can produce address labels, and pages of the diary notepad can be output to a printer.

In addition to these, stored in GENIE's memory are ASCII tables and lists of commonly used conversion factors eg metric to imperial units.

All the utilities in GENIE are MENU DRIVEN, making full use of cursor and function keys. There is an ON—SCREEN function key strip at the bottom of the display—NO need to change key strips to use GENIE!

If the information stored in GENIE is confidential, a password lock can be put on, barring access to all of the GENIE utilities.

THE HARDWARE

GENIE 'lives' on a small circuit board only 3 inches square.

The GENIE System hardware uses a totally new memory paging technique, developed by PMS, which maps 32K of ROM and 64K of RAM into the address space of a single 16K sideways ROM.

The GENIE board is connected to the computer via a single header on 6 inches of ribbon cable. This header plugs into any ROM socket on the main BBC, MASTER or COMPACT board.

NO flying leads—NO soldering—NO modifications.

The GENIE board can be positioned almost anywhere inside the machine. The ribbon cable is long enough to prevent physical conflicts with other hardware.

The power requirement of GENIE is very low, only slightly more than standard EPROMS, so there are no overheating problems.

"GENIE is a superb package. Its one of the few utility packages that I now couldn't be without" (*Acorn User, Aug 87*)
"GENIE rapidly becomes an integral part of your BBC system . . . well designed" (*Pop Comp Weekly, Jun 87*)
". . . GENIE does everything very quickly and never asks the user to wait . . . extreme friendliness of design . . . eminantly practical" (*A+B, June 87*)
"GENIE was the one piece of software I have always wanted in my BBC" (*Your Computer, July 87*)

PMS MULTI-FONT NTQ

Near Text Quality Typesetting Software

"Quite simply the best font software available for the BBC"—NTQ users say it—the reviewers agree—

If you want to produce quality worksheets, newsletters, OHP slides, menus, leaflets, concert programmes and tickets, exam papers, reports, invoices or just add style to your personal letters—NTQ's for you.

Use NTQ with VIEW, WORDWISE, INTERWORD, WORDPOWER* or BASIC on BBC, B, B+, MASTER, COMPACT and even ELECTRON with ANY EPSON compatible printer (MX and FX).

FONT LIBRARY CONTAINS OVER 35 HIGH QUALITY FONTS—standard typefaces + foreign languages + maths/science symbols + fancy styles.

Write or phone for leaflet and full list of fonts.

MIX FONTS, HEIGHTS, WIDTHS AND PITCHES IN ONE LINE OF TEXT-just like this:

MULTI-HEIGHT MULTI-WIDTH
MULTI-FONT MULTI-PITCH
BACKGROUNDS INVERSE
ÁóÄÆÇÈâòôùõlè α±÷×√÷≡≠~≃≈

Other features:

MICRO-JUSTIFICATION—right and left justified proportionally spaced text.

DRAFT mode—for a fast, rough copy for proof reading, but showing ALL NTQ features.

The basic NTQ system consists of a 2 ROM set—one ROM containing the NTQ driver software, and 3 fonts, the other containing a further 4 fonts. Any number of FONT EXTENSION ROMs can be added to the system, each one containing any 4 fonts of the user's choice selected from the FONT LIBRARY. Users can create their own fonts using the FONT DEFINER program supplied on the utilities disk. These fonts can be loaded into sideways RAM or burnt into ROM.

NTQ costs ONLY £34 (including VAT) plus £1 post and packing.

Please state disk size (5.25"/3.5") and printer type when ordering. For details of our Educational Site Licensing and Bulk Purchase agreements phone our Sales Office.

"Despite its power NTQ is a very easy package to use" (Educational Computing).

"The quality of text is quite outstanding" (TUBELINK).

*Also available: Power Font NTQ—a special version of NTQ for Ian Copestake's WORDPOWER word processor. This combines on-screen foreign/maths symbols with NTQ printout—a MUST for serious writers. (Phone 04867 4755 for info.).

A 6502 SECOND PROCESSOR AT AN AFFORDABLE PRICE!

PMS B2P-6502
THE SUB-£100 SECOND PROCESSOR

BANISH "Bad Mode" MESSAGES
- 30K BASIC—all MODES
- 44K in HiBASIC—from PMS

WIDEN WORD PROCESSING STORAGE
- 30K VIEW 2—80 column display
- 47K VIEW 3 and HiVIEW
- 42K HiWORDWISE PLUS—from PMS

SWELL SPREAD SHEET SIZES
- 30K VIEWSHEET—MODE 0
- 44K ULTRACALC 2
- 42K HiINTERSHEET

The B2P is fitted with a CMOS65C02 processor and works with both SINGLE and DOUBLE density DFS's. The "BOS" ROM, supplied with the B2P, contains the B2P Operating System + TUBE Toolkit — 65C02 disassembler, B2P memory editor, memory shifters, printer buffer.

The B2P runs software obeying the ACORN TUBE protocols, this includes BASIC, the whole VIEW family, PASCAL, COMAL, LISP, BITSTIK etc. . .

The B2P is only 5.5" × 4" — external to the BBC — can be fitted internally if desired.

"I have no hesitation in giving it a firm thumbs up — high power at low cost." Acorn User (March 87)

YOU CAN ADD SECOND PROCESSOR POWER FOR ONLY

£99.95 (including VAT) + £2 carriage.

HiBASIC (disk or ROM) **£5.** HiWORDWISE PLUS **£6.**

ALSO AVAILABLE the E2P-6502 — ELECTRON version of the 6502 Second Processor — only **£89** including VAT (Overseas orders no VAT required).




Permanent Memory Systems
38 MOUNT CAMERON DRIVE
EAST KILBRIDE G74 2ES
SCOTLAND



03552-32796 (24 Hour)

on entry, it was cleared prior to exit by the CLC command. The carry flag is bit 0 of the status register; &30 is 00110000 in binary, and therefore the final bit (bit 0) is clear.

Typical command use

The CALL command allows strings and variables to be passed to a machine code program too, and a typical use of the command might look a bit like the following example:

CALL code%, B%, B$

where code% is the memory location of the machine code, B% is an integer variable and B$ is an ASCII character string. In fact, CALL does not pass the values of these strings and variables, but instead it sets up a parameter block containing information as to where the variables can be located. The idea of parameter blocks was introduced some months ago; they are simply areas of memory into which data is put. In the case of the CALL command, take note that the parameter block is always to be found at &600.

Enter and run listing 3. You will get a list of results something like this:

```
 2    (&600)
 8    (&601)
 4    (&602)
 4    (&603)
65    (&604)
10    (&605)
81    (&606)
```

The numbers in brackets are addresses that I have added for ease of reference. Addresses and contents will be different for the various kinds of Acorn micros. But don't worry, the technique is always the same. At this stage I would recommend you work through the steps that follow, and ensure that you have pen and paper next to you.

Step by step

First note down the values returned. What we have done is to pass a variable and a string into some dummy machine code that does nothing other than beep. The values returned (and noted down remember!) are the bytes in the parameter block that point the way to this information.

Let's examine the parameter block in more detail. Each byte conveys the following information:

&600 = &02 - Number of parameters passed
&601 = &08
&602 = &04 - Address of first parameter (B% is stored at &408)
&603 = &04 - Parameter type code
&604 = &65
&605 = &10 - Address of second parameter (C$ is stored at &1065)
&606 = &81 - Parameter type code

The first byte in the block informs us how many parameters have been transferred – in this case two, but there could be many more. The next two bytes (at &601 and &602) contain the address of first variable, B%. In fact, as this is a resident integer variable, the address will be the same on each machine, &408. To prove this, all you do is enter the following line of Basic and press Return:

```
PRINT !&408
```

The result will be:

12345678

which is &12345678, as assigned in the program.

The next byte (at &603) is a type byte. As a variety of different types of parameters can be passed, it is important to know what type each is – this byte is a code to convey that information. Table 1 on page 49 lists the various types, and if various data is being passed, it is important to check each code. The first parameter, B%, has a code of four which shows it to be a four-byte integer variable.

Final type byte

The next two bytes contain the address of the second variable (the address on my machine is &1065), and the final type byte shows it to be a string variable. This address will probably be different for your machine. It is always very important to check the parameter type byte, more so when string variables are being mixed in with other parameters. The reason is that the address at &605 is not the address of the string variable itself, but of another parameter block! This contains four bytes of information. To see the contents of this parameter block, simply enter the following line of Basic and press Return:

```
FOR N%=&xxxx TO (&xxx
x+3):PRINT ~?N%:NEXT
```

The value &xxxx is the address of the second parameter block. On my machine the following four bytes are returned:

6E 10 12 A

These bytes convey the following information:

bytes 1 and 2 = Address of string
byte 3 = Length of string allocation block
byte 4 = Length of string

Printing the string

The bytes that we are interested in are the first, second and fourth. The first two bytes are the address where the string itself is stored (&106E in my case) and the fourth is its length. The following line of Basic will print the string – but you must remember to insert your own address and length values.

```
FOR N%=&106E TO (&106
E+&A):PRINT CHR$(?N%);:N
EXT:PRINT
```

Of course, because a machine code program can find out the address of the string or of an integer variable, it can use the string or variable as data. Because of this, the CALL command is used in a wide variety of programs, and, having looked at the basics, we'll examine some more practical uses for it in next month's First Byte.

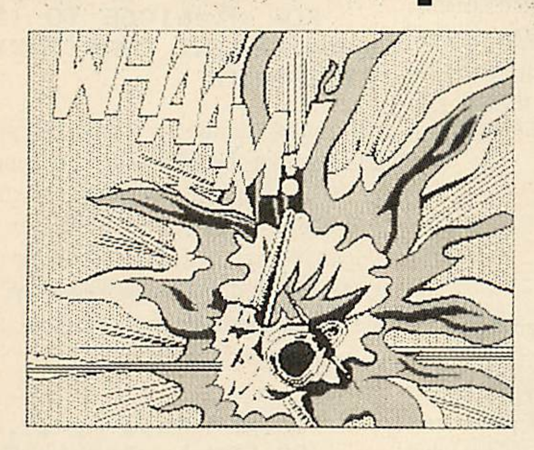
```
   10 REM Pass A,X,Y,C
   20 REM by Tessie Revi
vis
   30 REM For B/B+/E/M/C
   40 REM (c) Acorn User
 September 1987
   50 :
   60 DIM code% 255
   70 oswrch=&FFEE
   80 PROCassemble
   90 CLS
  100 INPUT "Accumulator
",A%
  110 INPUT "X Register
",X%
  120 INPUT "Y Register
",Y%
  130 INPUT "Carry Flag
(1/0)",C%
  140 CALL code%
  150 END
  160 :
  170 DEF PROCassemble
  180 FOR pass=0 TO 3 ST
EP 3
  190 P%=code%
  200 [OPT pass
  210 PHP
  220 JSR oswrch
  230 TXA
  240 JSR oswrch
  250 TYA
  260 JSR oswrch
  270 PLP
  280 LDA #ASC"1"
  290 BCS itsone
  300 LDA #ASC"0"
  310 .itsone
  320 JMP oswrch
  330 ]
  340 NEXT
  350 ENDPROC
```

Listing 1. Passing values to machine code

SUBSCRIPTION

AU OFFER

Save £29.00 on a disc subscription



Yes! We are offering a subscription to *Acorn User*'s monthly listings discs for an unbeatable £40!

You have probably already discovered how useful and enjoyable the *Acorn User* monthly discs are, and now you have the opportunity to guarantee delivery of 12 issues of the best quality utilities, graphics and entertainment available for only £40, saving £29 on the normal price. Subscribing to *Acorn User*'s monthly listings discs will save you hours of typing in the listings and de-bugging, leaving you more time to enjoy using them.

Over the year your monthly discs collection will grow into a useful and comprehensive library of programs which you can refer to again and again.

Hurry and post your order today as this fantastic offer closes on 30th September 1987!

This offer is only available to UK subscribers.

Yes! I wish to subscribe to *Acorn User*'s monthly listings discs.

Please start my subscription with the the ____________ issue.

NAME ____________

ADDRESS ____________

____

POSTCODE ____________

☐ I enclose my cheque/postal order for £40 made payable to Redwood Publishing Limited

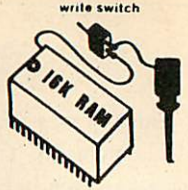
☐ Please charge my Access/Barclaycard

Account No: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry date: ☐☐☐☐

SIGNED ____________ DATE ____________

Send this coupon with your remittance to Gail Fairhall, Subscriptions Manager, Redwood Publishing Limited, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.

RAM MODULES
TAPE, DISC & NETWORK systems

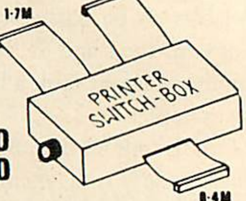


- ★ Plugs into any ROM socket, no soldering
- ★ 32k occupies two sockets (2x16k banks)
- ★ Easy-fit small size 35×18×14mm fully encased
- ★ ATPL versions available – adds extra 16/32k
- ★ Software includes full Load/Save/List ROMs 15k Printer buffer, Network easy-loader, view drive generator. Full documentation.

16K £16.95
32K £25.95

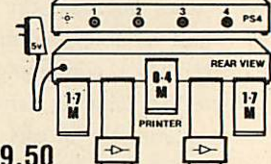
PRINTER SWITCH BOXES

- ★ Complete with all cables & connectors
- ★ Robust plastic case, 100×50×20mm
- ★ Selection by colour indicator button
- ★ Printed circuit board construction
- ★ Ready to use just plug in



PS1 2 BBC'S TO 1 PRINTER £31.50
PS2 1 BBC TO 2 PRINTERS £31.50

- ★ Quality modern style plastic case in beige/brown, size 205×145×40mm
- ★ Selection by push switches fitted with colour change indicator buttons
- ★ Data buffers fitted to the 3.7m cables for reliable data transfer. The cables on the PS3 box are 1×3.7m+2×1.7m
- ★ Complete and ready to use – just plug in

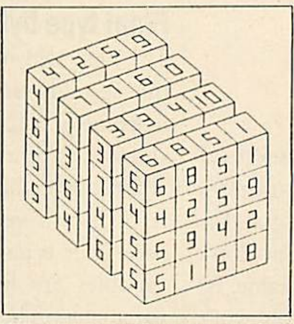


PS3 3 BBC's TO 1 PRINTER £59.50
PS4 4 BBC's TO 1 PRINTER £69.50
(Please add £2 for each BBC Compact)

Free P&P Send Cheques /PO/Official Orders to:
TERRELL ELECTRONICS, 7B Essex Gardens, Hornchurch, Essex RM11 3EH. Tel: (04024) 71426
Prices Exclude VAT EDUCATIONAL DISCOUNTS

THE MAGIC CUBE PUZZLE
(3 dimensional magic square puzzle)





On the left is shown a row of magic squares which together form a magic square in three dimensions called a magic cube.

The ultimate aim of this package is to reconstruct a jumbled up magic cube after first mastering the two dimensional version.

There are interesting number patterns which can help you in this task.

AVAILABLE ON CASSETTE FOR THE BBC MODEL B MICROCOMPUTER PRICE £7.99
MOSAIC SOFTWARE (AcAd), 4/15 THE GRANGE, LONDON SW19 4PS. TEL 01-946 4821

S. P. ELECTRONICS

SUBJECT TO AVAILABILITY

BBC SPECIALISTS

We are Acorn approved dealers & repair specialists

BBC Master 128 Computer	£425.00
BBC Master Compact from	£343.85
Acorn Electrons (When Available)	£49.00
Opus 40/80 Single Drive (No PSU)	£126.50
Opus 40/80 Single Drive (With PSU)	£160.95
Cumana 40/80 Double Sided Dual Drive	£340.00
Acorn 1770 DFS Kit	£49.90
Acorn ADFS ROM (For use with above)	£29.90
Citizen 120D Parallel Printer 120 CPS	£199.00
Canon PW1080A Parallel Printer 160 CPS	£299.00
BBC Parallel Printer Cable	£12.90
Computer Concepts Interword	£56.00
Computer Concepts Wordwise Plus	£56.00
Cassette Recorders from	£25.00
Wooden Plynths	£9.95

Wide selection or software, books, leads, plugs, etc. SAE for full list. All available Mail Order.

All prices only while stocks last

48 Linby Road, Hucknall, Notts. NG15 7TS
Tel: 0602 640377

(all prices include VAT)

Educational & institutional orders welcome

Carriage extra

ACORN FORUM

David Atherton guides us through fonts without tables, a file finding utility and some window modifications from readers

£20

ADFS FILE FINDER

Forum has just received a very useful machine code utility from *Acorn User* regular David Spencer, which will find any file on an advanced disc filing system disc, no matter which directory it is in, and whatever directory is currently selected. This is particularly useful if you have a lot of directories, and even more so if you are using a Winchester disc.

The program remembers the current directory, and then searches the tree-type directory structure of the ADFS disc. All the pathways to all files with that name will be reported.

The command is disc-based and takes the form *FIND (filename). Listing 2 on the yellow pages creates the machine code program called *FIND*. If a name is given in the command the search will start immediately on the currently mounted ADFS drive. If ADFS isn't the current filing system the OSWORD &72 routine will attempt to select ADFS. If you don't give a filename, the program will prompt you for one. The filename you type must not be more than 10 characters.

Any leading or trailing spaces are ignored, and as you would expect from a program that works with filenames, upper or lower case doesn't matter. Wildcards like * or # are not allowed. Any files which match the name you give will be printed out with their full directory path like this:

$.Club.Letters.Bank.NewChkBk

You can get out of the routine at any time simply by pressing Escape, but because the ADFS OSWORD routine does not check for Escape being pressed, it might not appear to work immediately.

The machine code routine uses just over 2k of memory from &E00, as well as zero page locations &A0 to &A8 for workspace. If you are using the program on a model B or B+, you should alter the start address (defined by the variable start) to the value of PAGE on your machine.

If you are only using modes 4 or higher, another place to store the code is at location &3000, which avoids wiping out the current program. If you have a second processor, the best place is below the screen in the I/O processor – perhaps &2400.

```
This is the normal BBC font
This is the new bold font
This is the new thin font
And this is italic
The effects can be combined
to give thin italics,
for example
```

You can combine bold and italic effects by running the font program twice (see below)

As well as the Escape error, the *FIND* utility can generate three other errors. 'Not found' (ERR = 128) is generated when the name file was not found in the directory hierarchy. 'Bad tree' (129) is equivalent to 'Broken directory' and is given if the string 'Hugo' isn't present at the beginning and end of the current directory, or if the two copies of the master sequence number don't match. These are the same criteria used by ADFS. 'ADFS error &?? at ??????' (130) is equivalent to 'Disc error' and is given if the floppy driver or hard-disc controller reports a read error. The error number and the sector address at which the error occurred are reported.

The operation of the program is to search the tree structure of the directories on the disc starting from the root directory and moving upwards.

For each entry in each directory, if it's a file, it is tested against the matching name. If it's a directory, it is searched at the next level down so the search proceeds recursively. The detailed operation is as follows:

1) The filename which is to be searched for is determined.
2) The find loop is then entered with the pointer appropriately set to the disc address of the root directory.
3) The routine is exited, via a 'Not found' error if appropriate.
4) The start of the main loop. The directory pointed to is read in to memory.
5) The name of the directory is added to a stack of names.
6) The name pointer is set to the first directory entry.
7) If the current directory entry is a file and it matches the given name, the pathway is printed out by reading the names off the name stack and adding the filename from the directory.
8) If the current entry is another directory, the pointer to the disc address of the current directory and the current name are stacked, and the main find loop is called with the pointer pointing to the subdirectory which has just been found.
9) The search is repeated for all the entries in the directory, then the directory name is taken off the stack.

£10

NEW FONTS WITHOUT TABLES

Daniel Neades from Bristol has sent me an interesting program listing which provides new fonts on the BBC Micro, without actually using any tables of data. The program, listing 1 on the yellow pages, works by taking the data from the existing fonts and applying various rotates and shifts to the bit patterns. There are three algorithms used. The bold pattern is produced by shifting each bit right once, and ORing it with the original dots. This effectively gives two pixels width for each place where there is one. The thin pattern

Cut-Price Disks from Direct Disk Supplies

from only £9.99 for 25 disks delivered to your door

Offer 1 *New* Premium Universals

Not only are all our universal disks individually certified to 96tpi but they are now prepared to an even higher specification to ensure fewer problems, high reliability and value for money. Plus, of course, our Lifetime Warranty. Disks are packed in 25s complete with envelopes, labels and write protect tabs.

£ 14.99	25 disks
£ 26.99	50 disks
£ 49.99	100 disks
£ 96.99	200 disks
£119.99	250 disks
£219.99	500 disks
£379.99	1000 disks

- ★ Full spec Higrade disks, made to 75% clipping level
- ★ Life-time no quibble warranty
- ★ Hub-rings on 5.25" disks
- ★ Label sets and envelopes included
- ★ No extras – VAT and delivery included



Bargain Box.

DDS do it again.

Have no doubts – these prices are the business. DDS offer you branded SCOTCH (made by 3M) at prices below other people's plain label disks. They're certified & tested error free by 3M; branded disks in tyvek envelopes with re-inforced hubs, labels & WP tabs are also included.

We only have a limited stock, and so it's first come, first served. A saving not to be missed!

	Price per order qty. (SSDD 48 or 96tpi please specify)	Approx price per disk ex-VAT (infor only)
20 disks	£ 10.99	48
40 disks	£ 19.99	44
60 disks	£ 28.99	42
80 disks	£ 36.99	40
100 disks	£ 42.99	38
200 disks	£ 82.99	36
500 disks	£199.99	35
1000 disks	£389.99	34

Offer 3 MEDIA LIFE 3.5" disks

Don't settle for less–get the best in FREE plastic library boxes.

Quantity	SS (includes plastic library box)	DS
10 disks	14.99	16.99
20 disks	28.99	33.49
50 disks	69.99	79.99
100 disks	129.99	149.99
200 disks	249.99	289.99
250 disks	299.99	359.99
500 disks	589.99	699.99

Made in Japan by a leading manufacturer, our single and double sided disks are fully tested and certified to 135tpi.

Don't forget – the price includes VAT, delivery and library boxes!

N.B. If you don't need boxes on quantities of 100 or more, then phone and ask for our special trader prices for BULK disks.

Offer 2

New from DDS

Super Savers on Single Sided

Total Price (No extras!)	
£ 9.99	25 disks
£ 19.48	50 disks
£ 37.99	100 disks
£ 74.99	200 disks
£ 93.99	250 disks
£185.99	500 disks
£299.99	1000 disks

Don't forget - No extras

It'll twist your tongue, but not your pocket!

Cash 'n Carry prices on disks from Direct Disk Supplies

Offer 4 'Rainbows'

25 Universal 96 tpi coloured disks, 5 disks of each of five different colours.

Code your files and programs using DDS 'Rainbows'. Without doubt the best quality and value coloured disk on the market.

£ 18.99	25 disks
£ 35.99	50 disks
£ 69.99	100 disks
£129.99	200 disks
£149.99	250 disks
£279.99	500 disks

How to order

ALL PRICES INCLUDE VAT & DELIVERY TO YOUR DOOR! NO HIDDEN EXTRAS

1. DIAL-A-DISK ON 01.979 7811, and give your ACCESS or VISA number and expiry date.
2. Send your cheque etc. to Direct Disk Supplies Ltd.,
3. Official Orders, Bona-fide orders from Universities, Colleges, Schools, Charities, etc are very welcome.
4. Cash orders, no minimum value. Account orders, minimum value £30.

DIAL-A-DISK ☎ 01-979 7811





Direct Disk Supplies Ltd.

DEPT AU, FREEPOST, 129 High Street, Hampton Hill, Middlesex TW12 1BR

MAKE YOUR MICRO EARN!

Yes, making money becomes incidental when you know how. Your micro is, if only you knew it, a gold mine, the size and make is irrelevant.

Make the initial effort **NOW** by starting your own

HOME BASE BUSINESS

Remember: You'll never get rich digging someone else's "ditch".

It's more rewarding than playing games.

The benefits are many and varied. Full or part time, for **FREE** details S.A.E. to,





97 Pilton Place (AU7)
King and Queen Street
Walworth, London SE17 1DR



VIDEO-TITLER II for the BBC-B

VIDEO-TITLER II is a sophisticated professional caption generator/video typewriter program with features that will impress both the pro and semi-pro video maker.

Features include:
★ 8 large fonts ★ Proportional spacing ★ Unlimited page saving & recall ★ Full, fast text editing with auto centering or screen positioning ★ Drop shadow & underlining ★ Use of 16 colours in Modes 1 or 2 ★ Broadcast-style VTR starter clock which allows the user to add college or company name & program identification ★ A full Mode 7 sub-titler program using centred double-height characters in blue box background, with full text editing, saving & reloading ★ Program also ideal for slide-making and A/V applications

Simplicity of use is the key to the success of this excellent suite of programs as used extensively by colleges and video-makers around the country. Supplied with full instructions, advise on titling your video productions and colour interfacing your BBC with a video recorder.

VIDEO-TITLER II is £15.75. Disc only. Please state 40 or 80 track. Official orders welcome. Available exclusively from:

☎ 01-446 1866
VISIONCRAFT SOFTWARE
PO BOX 135, LONDON N20 0HF

Price List — Education   September 1987

Whittle Systems

For YOUR NIMBUS PC Expansion

APPROVED CUMANA DISTRIBUTOR

HARDWARE

CSR200	5.25" DSDD External floppy drive for Nimbus	£124.00
CRM20	20 Megabyte external winchester for Nimbus PC	£575.00
CRM30	30 Megabyte external winchester for Nimbus PC	£599.00
CRM40H	40 Megabyte, high speed external winchester	£899.00
CRM60H	60 Megabyte, high speed external winchester	£1095.00
DTI MODEM CABLE	to Nimbus AUX port	£9.95
8 BIT PARALLEL PRINTER CABLE		£19.95

SOFTWARE

NIMBUS VIEWDATA	Complete local Viewdata package *(includes NVD-EDITOR, NVD-DISPLAY, NVDTUTOR, Modem cable)*	£95.00
TRAPDOOR	The ultimate debugging aid *(also available for IBM PC, APRICOT PC, XI, XEN)*	£49.95
ZEM	Z80 CP/M Emulator	£49.95
CP/M 80 Programmer's Guide	by Morrell & Whittle	£8.95

Network prices of software

Up to 8 stations	@ 3 × standalone price
Up to 16 stations	@ 4 × standalone price
Up to 24 stations	@ 5 × standalone price
Up to 32 stations	@ 6 × standalone price

All prices exclude P & P and Vat.

9, Herschel Crescent, Littlemore, Oxford OX4 3TS   Tel 0865 711956

is caused by the reverse effect, an AND operation, which removes pixels where they are alone in a row, and reduces pixel pairs to one pixel. The italic effect involves shifting the bottom row of pixels right twice, the next two rows once, and shifting the top three rows one to the left.

Daniel has a Master and he points out that once you have altered the font in this way, you can start the character designer on the Master Welcome disc, edit it if you wish, and save it to disc.

Because of the way Daniel's program works, you can combine bold and italic effects by just running the program twice. Also the emboldening, narrowing and italicising process can be applied to any fonts, not just the standard ones.

BBC model B and B+ owners should type the following:

```
*FX20,6
PAGE=PAGE+&600
NEW
```

before running the program, otherwise they will have problems. This 'explodes the character font' – which means that some extra memory is reserved for the new characters you have designed.

£5

MASTER ROM FILING SYSTEM

Andrew McMurry from Dublin doesn't like the fact that he has to load the ADFS formatter and backup utility from disc (and I must say I agree with him!). Andrew reminds us that if you use a ROM filing system (RFS) formatter, such as the one carried in *Acorn User* September 1986, or as found in *The BBC Micro ROM Book* by Bruce Smith (William Collins, price £10.95), you can copy the programs from ADFS to RFS, and then typing *-ROM-LIBFS to set the library filing system, will allow you to *RUN any machine code program in the ROM filing system, without leaving ADFS.

Basic programs won't respond to the library filing system idea, so any Basic utilities stored in ROM filing system must be loaded with LOAD "-ROM-prog". There are about 20 or so machine code programs on the Master Welcome disc which can be *RUN, and this is indeed a good way of avoiding having to have your Welcome disc to hand all the time, or having to copy standard utilities on to every disc you use as you go.

MASTER BASIC 4 TIP

Have you ever been writing a program and found at the end that you have put a space between some line numbers and program lines, but not others? Did you want to either remove them all, or insert one space in them all, but found it a messy manual job? Basic 4, the standard Basic on the Master came to my aid recently.

It has a feature whereby it ignores such spaces, if the LISTO option is not zero. If you have already typed in the program, *SPOOL it to a text file, type NEW then LISTO1, and *EXEC the program back in. That's all there is to it: the program loses all its extra spaces.

WINDOW MODIFICATIONS

D J Pipe submitted some modifications to David Lawrence's Window program in the December 1986 issue of *AU* so that it will run with shadow RAM switched on.

The modified program runs on a BBC B with the Aries B32 board fitted and Mr Pipe thinks it will work with the Aries B20 board or any other shadow RAM board that uses the *FX 111 call. The program does run slower but the advantage of all that extra programming memory is worth the loss of speed.

He has included lines 3000-3010 to leave the function key buffer available for use in the calling program. However, they should be left out if the program is located elsewhere in memory.

Here are the modified lines. Delete line 90 and add the following lines:

```
 295 osbyte=&FFF4
1855 JSR openscr
1865 JSR closescr
1905 JSR openscr
1915 JSR closescr
3000 ]
3005 P%=&C000
3010 [OPT pass
3015 .openscr PHA
3020 TXA:PHA
3025 TYA:PHA
3030 LDA #&6F:LDX #&00
3035 JSR osbyte
3040 PLA:TAY
3045 PLA:TAX
3050 PLA:RTS
3055 .closescr:PHA
3060 TXA:PHA
3065 TYA:PHA
3070 LDA #&6F:LDX #&01
3075 JSR osbyte
3080 PLA:TAY
3085 PLA:TAX
3090 PLA:RTS
3095 ]
3100 NEXT
3170 *SAVE "WINDOW" 90
0 C24
```

ELECTRON ADJUSTMENTS

After reading 'A Day at the Flicks' by Peter Voke in *AU* November 1986, W J Dawson noticed that the programs were stated to be unsuitable for the Electron, so he came up with the following adjustments to listings 1 and 2.

Add these lines to both listings:

```
 65 osbyte=&FFF4
 245 IF A%=1 Z%=&3000 E
LSE Z%=&5800
```

Change line 70 in both listings to:

```
 70 VDU 23;8202;0;0;0;
```

Replace line 250 (270 in listing 2) with this:

```
 250 PROCscrn(Z%)
```

Add the following procedure to both listings:

```
 500 DEFPROCscrn(Z%)
 510 LOCAL A%,X%,Y%,low
%,hi%
 520 hi%=Z% DIV 512
 530 low%=(Z% MOD 512)
DIV 2
 540 A%=151:X%=2:Y%=low
%:CALL osbyte
 550 A%=151:X%=3:Y%=hi%
:CALL osbyte
 560 ENDPROC
```

As the Electron does not have the 6845 CRTC fitted, we have to program the screen start address register directly, at &FE02 and &FE03 in the ULA, using OSBYTE 151. The value to be entered must be shifted right by one bit. This is what PROCscrn does.

With these changes to the programs they will work on the Electron.

Mr Dawson hasn't worked out a way to use the combined screen program, listing 3, as because of memory constraints and the lack of mode 7, this did not seem a practical proposition.

Thinking of PLAYING THE STOCKMARKET. . .
then you should consider one of the INVESTMENT ANALYSTS from Synergy Software

SHAREMASTER

ShareMaster is the ultimate investment analyst and reporting system for the BBC Micro.
"A sophisticated combined portfolio and price graphic program. . . comprehensive and easy to use" — Investment Chronicle
"The program represents value which does not seem to be equalled in its field" — Acorn User

Designed for the small or professional investor, ShareMaster is the most powerful tool available for predicting the mood and direction of the stockmarket and analysing investment performance. ShareMaster can analyse share prices, currencies, traded options, commodities or any other time based series by a variety of graphical, statistical and analytical measures to help you improve the timing and success of investment decisions.

Charting facilities include logarithmic-linear scaling, point & figure, linear regression, exponential curve smoothing, correlation, relative strength, comparisons, momentum, Rate of Change oscillators, moving averages, highs, lows, trendlines etc.

Profit Analysis facilities include Valuation, Performance Reporting, Single Share and Portfolio profit analysis, etc.

Numerical analysis facilities include a variety of indicators and statistics for any selected price range.

ShareMaster has extensive database and file management features including Company Profile, Transaction Reporting, File Import & full editing facilities.

These are only a fraction of the facilities offered by ShareMaster. Ask for our FREE comprehensive brochure.

ShareMaster is exceptionally easy to use and is supplied with a 96 page operating manual which includes sections on interpreting the indicators provided and their use in investment strategy.

We believe that no investment package can match ShareMaster in terms of facilities, performance, flexibility, ease of use and price. We firmly believe that ShareMaster will be the best investment you will ever make.

*** Also available. . . SHARE ANALYSER**
'excellent. . . very highly recommended' – *Which? Software Guide*
'an excellent program' – *Micro User*

A budget reporting, analysis and charting package designed for the small investor. Transaction and Share Price Databases are established for each share name and a variety of report and analysis facilities can be instantly accessed. Reports can be produced on any printer. Share Analyser is easy to use and is supplied with a 20 page operating manual. Ask for our FREE brochure.

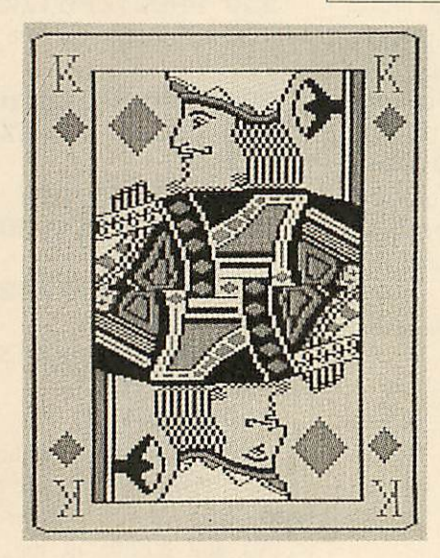
ORDER FORM: Please state 40 or 80 track-Dealer enquiries welcome. Prices include VAT and first class post. Overseas orders send price in. VAT for airmail despatch.
Cheque, Access, Visa and official educational orders accepted.

ShareMaster BBC B, B+ & Master computers	**£99.95**
Share Analyser BBC B, B+ & Master computers	**£24.95**

Send cheque, P.O etc to **Synergy Software, 7 Hillside Road, Harpenden, Herts AL5 4BS (Tel. 05827-2977).**

SUBSCRIPTIONS

ACORN USER OFFER



Get a listings disc free!

We are giving away our wonderful monthly listings discs, worth £5.95 and cassettes, worth £3.95 when you subscribe to *Acorn User* magazine.

All you have to do to guarantee 12 issues of *Acorn User* is to fill in the coupon below and choose your favourite *Acorn User* monthly listings cassette or disc. Choose from August '87 featuring *Calendar, Gus* (March '87), *Desalet* (May '87), *Super Plotter* (November '86) or even *Dodo* (August '86). Any one of our monthly listings will be yours absolutely free, when you subscribe now.

YES! I wish to subscribe to *Acorn User* starting with the ______ issue.

Please send my FREE monthly ☐ 40/80-track 5.25 inch disc/ ☐ cassette for the ______ issue. (Please allow 28 days for delivery)

NAME ______

ADDRESS ______

POSTCODE ______

☐ I enclose my cheque/postal order for £17.50 made payable to Redwood Publishing Ltd. ☐ Please debit my Access/Barclaycard/American Express

Account No: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry Date ☐☐☐☐

SIGNED ______ DATE ______

Send this coupon with your remittance in an envelope to **Gail Fairhall, Subscriptions Manager, Redwood Publishing Limited, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.**

Serious BBC Micro users start here...

NEW : Master Emulation ROM

The Master Emulation ROM (MER) emulates all the Master 128 extra commands on a Model B or B+. From power-up the additional '*' commands, *STATUS and *CONFIGURE system, and filing system and FX call extensions are available—in fact it's just like using a Master! If you have sideways or shadow RAM fitted to your machine, the ROM recognises this and fully implements the shadow and sideways RAM commands *SRLOAD/*SRREAD and *SHADOW. The ROM is compatible with most popular sideways and shadow RAM boards including Aries, Watford Electronics, and Solidisk. Every effort has been made to accommodate Master features, and as well as all the '*' commands the ROM provides extensions to OSFSC and OSARGS, OSGBPB with tape, the new ROM service calls, all the 1770 extra filing system calls (*EX, *MAP etc.), and a DFS/ADFS formatter and verifier. Even the @ feature has been added to BASIC. The complete and user-extendable *CONFIGURE system stores data either on disc or in battery-backed sideways RAM during power-down. NB: The MER does not support extended graphics.

The MER costs £19.95 inc VAT and p&p and a comprehensive 48-page manual. It is also supplied on disc for loading into sideways RAM at £14.95. The MER will be available from mid-September, but anyone ordering between now and 30 Sept 87 will receive a **free** book on assembly language, or a copy of Conversion Kit—specify which when ordering.

Master Operating System: A Dabhand Guide

Master Operating System: A Dabhand Guide by David Atherton is the only advanced user guide for the Master 128, Compact and BBC B+. 272 pages are crammed with a detailed examination of the MOS, with much previously unpublished information on areas such as the Tube, library filing systems, and non-volatile RAM. Areas such as sideways ROM service calls, shadow RAM for data storage, and differences between the various BBC micros are covered in immense and fascinating detail.

A companion disc contains the many example programs in the book, plus extra programs such as a Master total memory editor, and a useful utility ROM image. Book £12.95, Book and disc £17.95.

Orders

Send cheques PO or official orders to the address below, or quote your. Access/Visa number and expiry date. Access/Visa also accepted by telephone. Dealers and book trade orders welcome. P&P free in the UK. Abroad add £2 (£10 airmail). All discs available in 3.5" ADFS format—£2 extra. All discs are unprotected.

View: A Dabhand Guide

View: A Dabhand Guide by Bruce Smith is the definitive guide to the VIEW wordprocessor, 248 pages of expert guidance on all features including rulers, saving and loading text, markers, formatting and justification, margins, page layout, macros, printers and printer drivers, and continuous processing. ViewSpell and ViewIndex fully covered.

The companion disc contains many utility programs such as a complete file management system, a page preview utility, and an extended catalogue system, a printer driver generator, and a help system to use in Sideways RAM. Book £12.95 Book and disc £17.95

ViewSheet and ViewStore: A Dabhand Guide

Graham Bell's giant 300-page reference and tutorial guide for these two products, with utilities and examples such as building an invoice system. Lots of troubleshooting advice in clear and friendly style. Examples also available on disc. Available October 1987. Orders accepted now for priority despatch. Book £12.95 Book and disc £17.95

Fingerprint

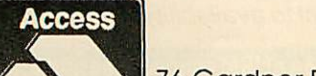
Fingerprint is a machine code monitor for all versions of the BBC Micro, with powerful single-step trace and execution facilities, full screen memory editing and disassembly for an amazingly low price! 8 breakpoints in RAM or ROM, full support for 65C02 & R65C02 mnemonics, unobtrusive 2-line display, output to screen, printer or RS232. Disc contains normal, sideways RAM, and Tube versions. Supplied with keystrip and 32pp manual. Only £9.95

Assembler Bundle

BBC Micro Assembly Language and *Assembler Workshop* both by Bruce Smith are superb books for anyone learning machine code programming. Get both these books plus their companion discs containing a total of 90 programs, and an update booklet specially written for Master users for a small fraction of the original £30 asking price—only £9.95 inclusive.

Conversion Kit

This collection of 26 assembly language routines by Bruce Smith takes the pain out of programming by providing all those tricky routines such as decimal to binary, hex to ASCII and so on. Disc also includes ROM image. Detailed manual. £7.95



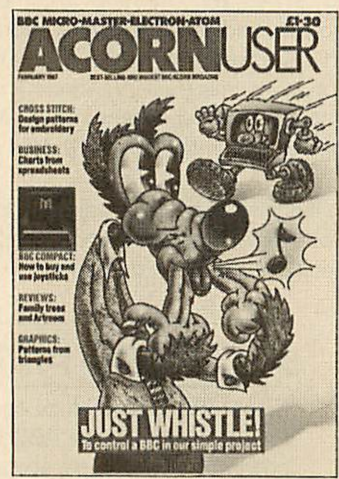
DABS PRESS
76 Gardner Road • Prestwich • Manchester • M25 7HU • © 061 773 2413



SUBSCRIPTION

AU OFFER

Free monthly programs



We are giving away our monthly listings discs – worth £5.95 and cassettes – worth £3.95, when you subscribe to *Acorn User* magazine. All you have to do to guarantee 12 issues of *Acorn User* and their safe delivery to you, is to fill in the coupon below and choose your favourite *Acorn User* monthly listings cassette or disc. Choose from any of the following: August '87 featuring *Calendar, Gus* (March '87), *Desalet* (May '87), *Super Plotter* (November '86) or even *Dodo* (August '86).

Any one of our monthly listings will be yours absolutely free, when you subscribe now.

YES! I wish to subscribe to *Acorn User* magazine starting with the ______________ issue.

Please send my FREE monthly ☐ 40/80-track 5.25-inch disc or ☐ cassette for the ______________ issue.
(Please allow 28 days for delivery)

NAME ______________

ADDRESS ______________

____

POSTCODE ______________

☐ I enclose my cheque/postal order for £17.50 made payable to Redwood Publishing Ltd.
☐ Please debit my Access/Barclaycard/American Express

ACCOUNT NO: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ EXPIRY DATE ☐☐☐☐

SIGNED ______________ DATE ______________

Please send this coupon together with your remittance in an envelope to Gail Fairhall, Subscriptions Manager, Redwood Publishing Limited, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.

CENTRAL LONDON COMPUTERS

SPECIAL OFFER NASHUA Diskettes £7.65 Per Box 10

BBC MASTER SERIES

AMB15 Master	£349.00
ADB12 Master ET	£312.00
ADC06 Master Turbo Upgrade	£97.50
ADC08 512k Upgrade	£189.00

UFD DISK DRIVES

with no power supply

MD400A 40/80 Track Switchable	£112.50
MD802C Dual 40/80 Track Switchable	£197.00

with integral power supply

MD400B single 400k, 40/80 Track Switchable	£127.00
MD802E dual 800k, 40/80 Track Switchable	£227.00
MD802M dual 800k, horizontally mounted in monitor stand, 40/80 Track switchable	£247.00

3.5" DRIVES WITHOUT POWER SUPPLY

MD400F single 400k, in dual case with blanking plate, to allow easy upgrade	£79.00
MD802F Dual 800k drive version of above	£169.00

3.5" DRIVES WITH POWER SUPPLY

MD400G As MD400F but with psu	£113.00
MD802G Ad MD802F but with psu	£185.00

3.5" & 5.25" DRIVE COMBINATIONS

COMBO(E) 5.25" 40/80 Track 400k + 3.5" 400k with psu	£225.00
COMBO(C) As above but no psu	£249.00

FD BOXED HARD DISKS FOR BBC AND MASTER SERIES

HD2000 20Mb hard disk in BM802E case with psu, control cards & BBC host adaptor	£499.00
HD4000 As above but with 40Mb hard disk	£799.00

MONITORS

BM7502 Philips High Res. Mon Screen	£69.00
Philips 8833	£229.00
1451MS Microvitec Med. Res. colour	£225.00
ARCHIMEDES	**CALL FOR PRICE**

FULL RANGE OF MONITORS PLEASE PHONE

PRINTERS

Star NL-10 Parallel	£226.00
Star NX-15 Parallel	£295.00
Star NR 15 9 pin 240 cps 132 col	£479.00
Star NB 24-10 pin 216 cps 80 col	£486.00
Star NB 24-15 pin 216 cps 132 col	£616.00

FULL RANGE OF PRINTERS PLEASE PHONE

FULL RANGE OF BBC SOFTWARE AVAILABLE PLEASE PHONE

CENTRAL LONDON COMPUTERS
01-323 2840
37 Store Street, London WC1

All prices are exclusive of VAT. Visa and Access accepted. Prices exclusive of postage and packing. Prices subject to change with out notice. All goods subject to availability.

BARCLAYCARD VISA · Access

We also supply a full range of IBM compatibles and Amstrad




STAR DEVICES

An Educational Adventure on disc for BBC B or RML 480Z Microcomputer.
from

STAR DEVICES LIMITED
THE CONCEPT KEYBOARD
SOFTWARE HOUSE

Available for the A3-128 or A4-128 CONCEPT Keyboard
Complete with 31 Supporting Work Cards

★★ £32.20 ★★

Inclusive of VAT Carriage and Insurance

STAR DEVICES LIMITED
Harman House
Andover Road
Winchester
Hampshire
SO23 7BS
Tel: 0962 63626

These materials were developed as part of the Microelectronics Education Program for England, Wales and Northern Ireland.

ATTENTION ALL AUTHORS!

WE ARE INTERESTED IN PUBLISHING YOUR

BOOKS

MAKE YOUR KNOWLEDGE PAY!
EXCELLENT ROYALTIES PAID FOR WORK UNDERTAKEN

Please send manuscripts to:

Peter Cockerill,
ARLOM HOUSE PUBLISHING.
STATION ROAD,
KINGS LANGLEY,
HERTS. WD4 8LP.
TEL: (09277) 68328.

SOFTWARE AUTHORS
Please send your BBC programs ON EITHER 40 TRACK or 80 TRACK DISC AND WE WILL CONTACT YOU WITHIN A FEW DAYS

ALL MATERIAL WILL BE TREATED IN THE STRICTEST CONFIDENCE

VERSATILE CAD/CAM
For the BBC Micro

A sophisticated, menu driven, user friendly **CAD/CAM** package with many facilities for very **accurate** drawing construction and data extraction for Numeric Control (NC) post processing. We welcome all enquiries from Education and small businesses.

CAD System (EDUCAD) – £80 (ex. vat)
* geometric/schematic drawings
* zoom, scale and units control
* text/symbols, any size and angle
* mirror and duplicate
* generalised x-y plotter output
* area properties
* construction/modification
* text/symbol font editor
* intersects and tangents
* rubber banding graphics screen dump
* revision/material info. editor

CAM System (EDUCNL – £35 (ex. vat)
* part geometry from EDUCAD
* tool path animation
* part profile definition
* generalised NC post processor

Econet Network versions available.

Both packages have explicit input prompts and error messages. This together with over 80 pages of online **HELP** data makes these systems easy to use and easy to learn – an ideal way of introducing this new technology.

TO ORDER simply specify disk format requirements or to obtain further details contact:

EDUSOFT,
Lodge Hill, Sevens Road,
Cannock Wood, Rugeley,
Staffs WS15 4RX

AA270

QUESTION: WHAT SEARCHES 150 MAGAZINES IN UNDER 300 SECONDS?
ANSWER: THE MAGAZINE BIBLIOGRAPHY DATABASE

It contains details of nearly 21,000 references and includes every issue of ACORN USER, MICRO USER, A&B COMPUTING, EDUCATIONAL COMPUTING and BEEBUG e.g. articles, listings, reviews, hints, tips, corrections, news items and readers' letters — everything remotely related to the BBC Micro!

Choose any subject or keyword; the fast two-string search option (0.39 seconds per 10K) provides the title, description, source, page number and date of all occasions when it has been written about, on screen with global or selective copy.

Magazine reviewers have called it "the ultimate index", "a valuable asset that has tremendous possibilities", "outstanding", "unique" and a "remarkable product". B/B+/Master compatible.

MAGAZINE BIBLIOGRAPHY 1-16	(Dec '81-April '87)	1,415K	£60
ACORN USER 1-4	(July '82-Dec '86)	394K	£20
MICRO USER 1-3	(March '83-Aug '86)	255K	£15
A & B COMPUTING 1-3	(May '83-May '87)	282K	£15

Please specify number of tracks, sides and drives when ordering, or send large S.A.E. for full details. All prices inclusive of p+p + VAT.

Mc Hugh Enterprise,
43 Hookstone Oval,
Harrogate HG2 8QE.

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE
17 Burnley Road, London NW10 1ED Tel: 01-208 1177
305 Edgware Road, London W2 Tel: 01-723 0233

BBC MASTER SERIES

AMB15 MASTER (see page 6 for details of bundled software included in the price)	£346 (a)
AMB12 MASTER ET	£315 (a)
AMCO6 Turbo 65C02 Module	£99 (b)
ADC08 512 Processor	£195 (b)

ADF14 ROM Cartridge	£13(d)	ADJ23 Ref Manual Part II	£14(c)
ADF10 Econet Module	£41(c)	ADJ24 Adv Ref Manual	£19.50(c)
ADJ22 Ref Manual Part 1	£14(c)	View User Guide	£10(d)
BBC Master Dust Cover	£4.75(d)	Viewsheet User Guide	£10(d)

MASTER ROM/RAM CARTRIDGES

TRC1 Two rom cartridge	£8.95 (d)
TRC4 Four rom cartridge	£11.95 (d)
TRC 32K Cartridge inc RAM	£29.95 (d)

ARCHIMEDES

Limited quantities of these new computers are now becoming available. Place your orders now to ensure early delivery.

BBC MASTER COMPACT

See page 6 for free bundled software

SYSTEM 1 128K, Single 640K Drive & bundled software.	£349 (a)
SYSTEM 2 System 1 with a 12" Hi Res Monochrome Monitor.	£399 (a)
SYSTEM 3 System 1 with a 14" Med Res RGB Monitor.	£549 (a)
Second Drive Kit.	£99 (c)
Serial Kit.	£29 (d)
T.V. Modulator	£29 (d)
Extension cable for external 5.25" 80T Drive .	£12.50 (d)
Mertec Adaptor (Upgrades to almost master level)	£35 (c)



FILE STORE

Acorn's new file server system	
Filestore E01	£285 (a)
Filestore E20	£710 (a)
Full details on request	
Acorn 30Mb Winchester (incl FS III Software)	£1530 (a)

UPGRADE KITS

1.2 OS ROM	£15 (d)	ADFS ROM	£26 (d)
DNFS ROM	£19 (d)	1770 DFS Kit	£43.50 (d)
BASIC II ROM	£22.50 (d)	Econet Kit	£55 (d)

ECONET ACCESSORIES

Econet Starter Kit	£85 (b)	Econet Bridge	£174 (b)
Econet Socket Set	£29 (c)	Printer Server Rom	£41 (d)
File Server Level II	£75 (b)	10 Station Lead Set	£26 (d)
Master FS Utility Disc	£17.25 (d)		

ACW/CO-PROCESSOR

For full specification see page 5

32016 Co-processor	£999 (a)
Cambridge Workstation	£3450 (a)
X25 Gateway	£2175 (b)

WINCHESTER DRIVES

P20HD TECHNOMATIC 20 Mbyte Winchester Drive	£499 (a)
P40HD TECHNOMATIC 40 Mbyte Winchester Drive with Acorn ADFS ROM	£749 (a)
P204HP TECHNOMATIC 20 Mbyte Winchester and a 80T DS floppy Drive built in a monitor stand. Includes ADFS Rom.	£769 (a)
P2041HT As P204HP but also with a 10 Mbyte tape streamer backup unit and backup utilities. Includes ADFS Rom.	£1295 (a)
TS10 10 Mbyte Tape Streamer Backup unit with utilities.	£599 (a)
TFC10 10 Mbyte Pre-formatted Cartridge for use with P2041HT and TS10.	£19 (d)
Special adaptor for S.J. File Server	£28 (d)

Enquire for larger capacity Winchesters.
These Winchesters are compatible with the S.J. File Server.

WINCHESTER Drive Multiplexer

TWM2 for two computers.	£99 (b)
TWM4 for four Computers.	£159 (b)

SECOND PROCESSORS

Universal 2nd Processor Adaptor	£75 (b)
TORCH ZEP100	£229 (a)
MULTIFORM Z80 TECHNOMATICs multi format Z80 system includes a FREE Pocket Wordstar + MS/DOS Read/Write Utility	£289 (b)

ACORN IEEE INTERFACE

Allows BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard. The interface can link upto 14 compatible devices. Typical applications are in experimental work in academic and industrial labs.	£265 (a)

PRINTERS

EPSON LX800 150 cps, variety of fonts, including NLQ, bit image graphics, IBM char/graphics compatible, centronics interface and tractor feed as standard	£229 (a)
EPSON FX800 An enhanced version of FX85. Call for details.	£315 (a)
EPSON FX1000 An enhanced version of FX105. Call for details.	£439 (a)
EPSON EX800	£409 (a)
EPSON EX1000	£595 (a)
Colour option for EX800/EX1000.	£59 (b)
EPSON LQ800	£439 (a)
EPSON LQ1000 As LQ800 but wider carriage for 136 columns.	£609 (a)
TAXAN KP815 Enhanced KP810 with 160cps and full IBM compatibility.	£269 (a)
TAXAN KP915 Enhanced KP910 with 180cps and full IBM compatibility.	£369 (a)
NATIONAL PANASONIC KX P1081 includes *free* Wysiwyg + Rom and Printer Lead	£159 (a)
STAR NL 10 (Parallel Interface)	£209 (a)
STAR NL 10 (Serial Interface)	£239 (a)
INTEGREX Multicolour Inkjet printer.	£549 (a)
Ideally suited for high res colour VDU screen dumps. Quiteness & consistent output are major characteristics.	£525 (a)
BBC Screen dump for Integrex.	£15 (d)
BROTHER HR20 A new attractively styled printer from Brother with unusually quiet operation, host of new fatures, including option to copy current documents. 8K buffer standard expandable to 16K. Parallel & Serial ports as standard.	£349 (a)
NAT PANASONIC KX P3131 Daisy wheel printer with 38K buffer, 17 cps, bi-directional, parallel interface	£249 (a)
JUKI 6100 Daisy wheel printer 15 cps, 2K buffer, switchable 10/12/15 cpi proportional spacing, underlining. Parallel interface.	£310 (a)

PLOTTERS

HITACHI 672	£495 (a)
LINEAR GRAPHICS Full range of accessories available for plotmate plotters	
A4S PLOTMATE	£370 (a)
A4SM PLOTMATE	£450 (a)
A3M PLOTMATE	£569 (a)
(Enquire re special prices on Linear Graphics plotters)	
Parallel Printer Lead (1.2m).	£6 (d)

PRINTER SHARERS & BUFFERS

BUFFALO PB Buffer
Parallel buffer for internal fitting to most Epson printers. Simple to instal.
PB128 (128K) £89 (c)

PERIPHERAL & COMPUTER SHARERS
High quality switches to allow the user to switch between computers, printers, modems etc. Fully shielded metal cases. all lines fully switched.

	Parallel		Serial
2 Computers to 1 Printer 36v36-2	£25(c)	25v25-2	£25(c)
3 Computers to 1 Printer 36v36-3	£39(c)	25v25-3	£39(c)
4 Computers to 1 Printer 36v36-4	£45(c)	25v25-4	£45(c)
2 Computers 2 Printers X-over 36v36-x	£49(c)	25v25-x	£49(c)
BBC Cable set 3 to 1 (1m ea)	£24(c)		
BBC Cable set 4 to 1 (1m ea)	£30(c)		

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable £22 (c)

Paper & Labels
Plain fanfold paper with microperforation:

2000 sheets 9½ × 11"	£12 (£3.50)
2000 sheets 14½ × 11"	£18.50 (£4.50)
1500 sheets A4 90gsm	£18.00 (£4.00)

Labels/1000

Single Row 3½ × 1 7/16"	£5 (d)
Triple Row 2 7/16" × 1 7/16"	£5 (d)

TECHNOLINE
(24 hr viewdata system)
Tel:01-450 9764

MAIL ORDER
17 Burnley Road
London NW10 1ED
Telex:922800

RETAIL SHOPS
15 Burnley Road, London NW10 1ED
Tel:01-208 1177 Telex:922800
(close to Dollis Hill ⊖)
West End Branch
305 Edgware Road, London W2
Tel:01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Acess Card

Orders welcome from government depts & educational establishments

All prices ex VAT.
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

DISC DRIVES

All floppy drives carry a two year warranty

5.25" Single Drives 40/80 switchable:

TS400 400K/640K	£105 (b)
PS400 400K/640K with integral mains power supply	£115 (b)

5.25" Dual Drives 40/80 switchable:

TD800 800K/128OK	£185 (a)
PD800 800K/1280K with integral mains power supply	£209 (a)
PD800P 800K/1280K with integral mainspower supply and monitor stand	£229 (a)

3.5" 80T DS Drives:

TS351 single 400K/640K	£75 (b)
PS351 single 400K/640K with integral mains power supply	£99 (b)
TD352 Dual 800K/1280K	£134 (b)
PD352 Dual 800K/1280K with integral mains power supply	£152 (b)
PD853 Combo Dual 5.25"/3.5" drive with psu.	£209 (a)

DISC DRIVE MULTIPLEXER

TDM2 Dual Unit: 2 computers/one drive unit	£75 (b)
TDM4 Quad Unit: 4 computers/one drive unit	£135 (b)

3M FLOPPY DISCS

New low prices plus winter Olympic competition. Every pack supplied with a competition entry leaflet. Instant prizes plus first prize of trip for two to Winter Olympics and five 2nd prizes of £1,000 of recording equipment.

5.25" Discs in packs of 10

744 40T SS DD	£8.50 (d)
745 40T DS DD	£10.50 (d)
746 80T SS DD	£11.50 (d)
747 80T DS DD	£13.25 (d)

(Add £1 for library case packing)

3.5" Discs in packs of 10

80T SS DD	£15 (d)
80T DS DD	£19.50 (d)

BULK DISCS

50 5.25" 40 T single sided discs with sleeves in lockable box.	£25 (b)
50 5.25" 80 T double sided discs with sleeves in lockable box.	£36 (b)
50 3.5" 80 T double sided discs with sleeves in lockable box.	£60 (b)

FLOPPICLENE DRIVE HEAD CLEANING KIT

5.25" Kit with 20 disposable discs	£12.50 (d)
3.5" Kit with 20 disposable discs	£14.00 (d)

DISC STORAGE BOXES

DB340 Lockable 40 x 3.5"	£8.50 (c)
DB550 Lockable 50 x 5.25"	£9.00 (c)
DB570 Lockable 70 x 5.25"	£11.00 (c)
DB5100 Lockable 100 x 5.25"	£13.00 (c)

MONITORS

BBC lead incl with all monitors

MICROVITEC 14" RGB Monitors
Please specify plastic or metal case.

Microvitec 1431 Standard Resolution 453 pixels	£179 (a)
Microvitec 1431AP As 1431 + composite video and sound input	£199 (a)
Microvitec 1451 Medium Resolution 653 pixels	£225 (a)
Microvitec 1451AP As 1451 + composite video and sound input	£255 (a)
Microvitec 1441 High Resolution 895 pixels	£359 (a)

Microvitec 20" RGB/PAL/ Audio Monitors

Microvitec 2030CS Standard Resolution RGB/Comp Video	£380 (a)
Microvitec 2040CS High Resolution RGB/Comp Video	£685 (a)
TOUCHTEC-501 Brings genuine touch screen operation on metal cased Microvitec monitors, incl utilities disc with starter and development programs	£239 (b)
TAXAN SUPER VISION 620 12" Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible	£269 (a)
TAXAN SUPER VISION 625 12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible.	£319 (a)

12" MONOCHROME MONITORS

TAXAN KX 117 Hi Res green etched screen	£85 (a)
TAXAN KX 118 Hi Res Long Persistence (P39)	£90 (a)
TAXAN KX 119 Hi Res amber etched screen	£90 (a)
PHILIPS BM 7502 Hi Res green screen.	£69 (a)
PHILIPS BM7522 Hi Res amber screen.	£75 (a)
PHILIPS BM 7542 Hi Res White screen.	£79 (a)

MONITOR ACCESSORIES

Microvitec Swivel Base (14" plastic monitors)	£20 (c)
Philips Swivel Base	£14 (c)
Monitor Stand Models B & B+	£10 (c)
Monitor Stand Master	£13 (c)
Double Tier stand Models B, B+ or Master	£24 (b)
Taxan RGB Lead	£5 (d)
Microvitec Lead	£3.50 (d)
Monochrome BNC/Phono Lead	£3.50 (d)

EPROMS/RAMS

2764-25
27128-25
6264LP-15
27256
27512

} all prices on application

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms + 2 8K Rams	£37 (c)
ATPL Battery backup kit	£16 (d)
ATPL Board for BBC+	£31 (c)

TIME WARP

Real Time Clock. Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program	£31 (d)
Time Warp with PANOS Utilities.	£39 (d)

MODEMS

All modems listed below will be supplied with BBC Publications ModemMaster comms package and a BBC data lead.

MIRACLE WS2000V21/23 & BELL stds	£92 (c)
WS2000 Auto Dial Card	£27 (d)
WS2000 Auto Answer Card	£27 (d)
WS2000 SK1 Kit	£5 (d)
WS2000 User Port Lead	£5 (d)
MIRACLE WS4000 V21/23	£149 (b)
MIRACLE WS3000 V21/23	£265 (b)
MIRACLE WS3000 V22	£445 (b)
MIRACLE WS3000 V22 bis	£585 (b)

(All modems are BABT approved)

BBC Data Cable for WS3000/4000	£7 (d)

PROGRAMMING ACCESSORIES/SOFTWARE

See page 5 for detailed specification

Compatible with B, B+ and Master

EpromRyter (Epromer II) Eprom Ryter is compatible with BBC Master only	£119 (b)
Upgrade of Epromer II to Eprom Ryter (Please return your Epromer II)	£49 (b)
EPROMER II	£89 (b)
MPROMER	£49 (c)
META ASSEMBLER	£145 (b)
PORTAL EPROM EMULATOR 512K	£245(b)
TEAM Disassembler	£145 (b)

EPROM ERASERS

UV1B 6 eproms, safety cutout	£47 (b)
UV1T 6 eproms, timer, safety cutout	£59 (b)

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE
17 Burnley Road, London NW10 1ED Tel: 01-208 1177
305 Edgware Road, London W2 Tel: 01-723 0233

CAD/DRAWING PACKAGES

NOVACAD
Cad Package for B, B & MASTER.
(See page 5 for specification)

Tracker Ball/Mouse Version (TM)	£79 (d)
TM Version plus Tracker Ball	£119 (c)
TM Version plus Mouse	£105 (c)
Plotter Driver Generator	£25 (d)

MOUSE

AMX MOUSE with SUPER ART (pse specify B, B+ or Master)	£63 (d)
PAGEMAKER	£32 (d)
EXTRA/EXTRA (utility for the Pagemaker)	£19 (d)
MAX	£17 (d)
STAND ALONE MOUSE (includes horizontal scroll lock)	£34 (c)

RB2 TRACKER BALL

RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' for use with NOVACAD & other software)	£47 (c)
Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR	£35 (d)

CP/M SOFTWARE

Send for details on our full range of CP/M & PC DOS packages for Business, Communications & High Level Languages.

Please send for details on our range of CP/M software for Acorn/Torch Z80 2nd Processors

BBC SOFT/FIRMWARE

*All software supplied by us is known to operate with the appropriate Acorn Disc filing systems. We **cannot** comment on their use with other DFS systems.*

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£37 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)
ACORN OVERVIEW PACKAGE Special Offer (RRP £86)	£57 (b)

WORD PROCESSORS

ACORN VIEW PROFESSIONAL	£85 (c)
VIEW 2.1	£37 (d)
VIEW 3.0	£54 (c)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£7 (d)
VIEWSPELL	£29 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£47 (d)
INTERWORD	£39 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£37 (d)
WINDOWMATIC	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£37 (d)
INTERCHART	£26 (d)
ULTRACALC	£29 (d)
MINI OFFICE II DISC Version	
For B & B+ 40T or 80T	£14.50 (d)
For Master 80T	£17.30 (d)
For Compact	£19 (d)
MINI OFFICE II ROM Version	
For Master, Compact, B+ & B	£48 (c)

LANGUAGES

META ASSEMBLER	£145 (b)
TEAM DISASSEMBLER	
MACROM	£33 (d)
ACORN MICRO PROLOG	£62 (d)
ISO-PASCAL	£51 (c)
ISO-PASCAL STAND ALONE GENERATOR	£30 (d)
OXFORD PASCAL (40 or 80T) Specify B or B+	£36 (d)
OXFORD PASCAL for Master	£52 (d)
ACORN LOGO	£46 (c)
LOGOTRON LOGO	£55 (c)
BBC PUBLICATIONS OPEN LOGO	£59 (c)
ACORN LISP ROM	£43 (d)
ACORN FORTH ROM	£39 (d)
ACORN COMAL ROM	£43 (d)
MICROTEXT	£52 (c)
MICROTEXT PLUS	£229 (b)

COMMUNICATIONS

TERMULATOR	£25 (d)
COMMSTAR II	£28 (d)
COMMUNICATOR	£49 (d)
MODEM MASTER	£11 (d)
COMMAND	£34 (d)
MASTER TERMULATOR	£34.75 (d)

COMPACT (all on $3\frac{1}{2}''$ disc)

ARTROOM	£27 (d)
FONTWISE+	£22 (d)
FONT EDITOR	£22 (d)
RAMROD	£37 (d)
BROM PLUS	£32 (d)
MACROM	£37 (d)
BETABASE	£27 (d)
WHITE KNIGHT MKII	£16 (d)
BBC PUBLICATIONS BUNDLED SOFTWARE	£18.50 (d)

UTILITIES

ACCELERATOR	£49 (d)
ACORN BASIC EDITOR	£24 (d)
MONITOR (BBC Pub)	£19 (d)
BROM PLUS	£26.50 (d)
SLEUTH	£23 (d)
TOOLKIT PLUS	£31 (d)
TOOLBOX 2 (BBC Pub) Manual	£9.50 (d)
Cassette	£9 (d)
ACORN GXR GRAPHICS ROM specify B or B+	£24(d)
PRINTMASTER	£24 (d)
PRINTWISE	£24 (d)
DUMPMASTER	£26 (d)
FONTWISE PLUS	£17 (d)
HERSHEY FONT CHARACTER GENERATOR	£18 (d)
ICON MASTER	£29 (d)
MOVIE MAKER Two Roms + Cassette	£26 (d)
ADV TELETEXT UTILITIES ROM	£7.95 (d)

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

PRIMARY EDUCATION

ASTRONOMY		£11 (d)
COMPUTERS AT WORK	Aud/EC/disc	£16 (c)
PICTURE CRAFT	Disc	£17 (d)
INTRODUCING GEOGRAPHY	Disc	£16 (d)
MATHS WITH A STORY 1	Cass	£8 (d)
MATHS WITH A STORY 2	Cass	£8 (d)
NUMBER GAMES	Cass/EC	£7.50 (d)
USING YOUR COMPUTER	Cass	£24 (c)

SECONDARY LEARNING

TECHNOLOGY & DESIGN Pt1		£21.50 (c)
ELECTRIC FIELDS		£10.50 (d)
ADVANCED LEVEL STUDIES: STATISITICS	Disc	£23 (d)
ADVANCED STUDIES: GEOGRAPHY	Cass	£10 (d)
INSIDE INFORMATION	Prog Cass	£10 (d)
	Audio Cass	£5 (d)
	Book	£8 (d)
SCIENCE TOPICS (ST)		
S.T.:WAVES	Disc	£14 (d)
S.T.:RELATIONSHIPS	Disc	£14 (d)
S.T.:BONDING	Disc	£14 (d)
S.T.:ELECTROMAGNETIC SPECTRUM	Disc	£14 (d)
S.T.:ELECTRONICS IN ACTION	Disc	£14 (d)
S.T.:NEWTON & THE SHUTTLE	Disc	£19 (d)
S.T.:ECOLOGY	Disc/EC	£19 (d)
S.T.:POLYMERS	Disc/EC	£19 (d)
S.T.:CLASSIFICATION & PERIODIC TABLE	Disc	£20 (d)
S.T.:FOOD & POPULATION	Disc	£20 (d)
SEC.SCIENCE MICROTECHNOLOGY	Cass	£7 (d)
SEC.SCIENCE:THE MOLE CONCEPT	Disc/Aud/EC	£16 (c)

GENERAL

VU-TYPE PROFESSIONAL	Disc	£19 (d)
WHITE KNIGHT MK II (for compact)	Disc	£16 (d)
BATTLEFIELDS	Cass	£8.50 (d)
A VOUS LA FRANCE	Cass/EC	£17 (d)
	Book	£5.25 (d)
	Audio Cassettes (2)	£7.50 (a)
Additional charges for discs		£9.00 (d)
DEUTSCH DIREKT	Disc/aud/EC	£16 (c)
	Book	£5.95 (d)
MODEM MASTER		£11 (d)

Cassette based programs listed above can be supplied on disc at an extra charge of £1.50 per disc and please specify the format required 40 or 80T.

TECHNOLINE
(24 hr viewdata system)
Tel:01-450 9764

MAIL ORDER
17 Burnley Road
London NW10 1ED
Telex:922800

RETAIL SHOPS
15 Burnley Road, London NW10 1ED
Tel:01-208 1177 Telex:922800
(close to Dollis Hill ⊖)
West End Branch
305 Edgware Road, London W2
Tel:01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Acess Card

BARCLAYCARD VISA Access

Orders welcome from government depts & educational establishments

All prices ex VAT.
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

PRINTER ACCESSORIES

EPSON ACCESSORIES:
Interfaces:
8143 RS232......£30 (d)
8148 + RS232 + 8K......£65 (d)
8165 IEEE + Cable......£65 (d)
8132 Apple II......£60 (d)
8177P NLQ for FX80 + /FX100 + ...£99 (d)
Parallel & Serial Buffers of various size also available.
FX80/80 + /85 Tractor Attachment......£29 (c)
LX80/86 Tractor Feed......£21 (c)
LQ800 Tractor Feed......£47 (b)
LQ1000 Tractor Feed......£52 (b)
EX800/1000 Colour option......£59 (b)
H180 HP GL Emulation Rom + Ram......£63 (c)
H180 Printer Emulation Rom......£38 (c)
SHEET FEEDERS:
8338 LX80......£52 (b)
8333 FX100 + /105......£169 (a)
8331 FX80 + /85......£129 (b)
LQ800......£135 (b)
LQ1000......£179 (b)
EX800......£135 (b)
EX 1000......£309 (b)
FX 800......£135 (b)
FX 1000......£179 (b)
Ribbons:
RX/FX100/100 + . FX105......£7 (d)
RX/FX80/80 + , FX85......£4 (d)
LX80......£4.50 (d)
LQ800......£8.50 (d)
LQ1000......£10 (d)
EX800/1000......£7.50 (d)
H180 Pen Set (Aqueous/Ball point)......£8.25 (d)
Dust Covers:
FX80......£5.50 (d)
TAXAN/Canon KP810......£6 (d)
FX100......£7.50 (d) **KP910 £7 (d)**
HITACHI 672 Plotter
Aqueous Pen Set six pens......£18.50 (d)
Oil Based Pen Set six pens......£25.00 (d)
TAXAN CANON Accessories:
RS232 + 2K interface......£63 (d)
Ribbon, KP810/815/910/915......£6 (d)
Star Printer
NL10 Sheet Feeder......£52 (b)
NL10 RS232 Interface......£69 (c)
NL10 IBM Type Interface......£39 (c)
NL10 Ribbon......£4.50 (d)
National Panasonic KX P1080/81
Spare Ribbon......£4.50 (d)
Serial Interface......£39 (c)
KXP3131 Tractor......£90 (a)
KXP3131 Sheet Feeder......£189 (a)
JUKI 6100
RS232 Interfaces......£65 (d)
Tractor Feed......£149 (a)
Ribbon (Carbon)......£2.00 (d)
Spare Daisy Wheel......£14 (d)
Sheet Feeder......£219 (a)
BROTHER HR20
Daisy Wheel......£18 (d)
Tractor Feed......£116 (a)
Spare Ribbon Nylon......£3.00 (d)
Spare Ribbon Carbon......£4.50 (d)
INTEGREX INK JET COLOUR PRINTER
Spare Ink Cartridge Black......£9 (d)
Spare Ink Cartridge Colour......£15 (d)
Paper Roll......£7 (d)
Printer Leads:
BBC Parallel Lead (1.2m)......£6 (d)
BBC Serial (Epson) Lead (1.2m)......£7 (d)
Other lengths can be supplied on order:
IBM Parallel Lead (2m)......£12 (d)
PAPER & LABELS
Plain Fanfold paper with micro perforations:
2000 sheets 9½''x11'' 60 gsm/sq m......£12 (£3)
2000 sheets 14½''x11'' 60gsm/sq m......£18.50 (£4.50)
1000 sheets A4 90 gsm......£12 (b)
Labels/1000:
Single Row 3¼ × 1 7/16"......£5.25 (d)
Triple Row 27/16" × 17/16"......£5 (d)

WYSIWYG PLUS

WYSIWYG PLUS is a printer and screen utility for Wordwise Plus, View, Interword, and Basic users, supplied on a 16K Eprom. To obtain a particular printer effect, such as enlarged text, it used to be necessary to discover the appropriate 'printer control code' from your manual and incorporate it into your text. Secondly, you had to print several trial copies in order to position the effect correctly in relation to the rest of your text.

WYSIWYG PLUS simplifies this trial and error approach using easily remembered *commands. For example, *ENLARGED not only selects enlarged text on your printer, but uniquely shows you double width characters on your screen, even from within Wordwise Plus!

WYSIWYG PLUS incorporates a logo editor. Just draw your design on screen using the arrow keys, and save the results. Use the *GRAPHICS command to incorporate your design anywhere in your text; position and see your design in your text before faithfully reproducing a hard copy.

There is also special help for daisy wheel users. The *WHEEL command will prompt you to change daisy wheels whenever a change in type style is about to occur.

WYSIWYG PLUS is designed to work with the following systems:

BBC Model B
BBC Model B +
BBC Master 128
BBC Compact
6502 Second processor,
Turbo coprocessor
All printers (Except lasers)

WYSIWYG PLUS workspace is relocatable.

WINDOWMATIC

All users of Acorn's VIEWSHEET speadsheet program will be aware of its powerful windowing facility which allows the screen and/or printer to be configured in up to 10 seperate windows taken from anywhere in the sheet. They will also be painfully aware of how difficult and time consuming it is to set up a required display. Although VIEWSHEET allows configurations to be saved to the media, it does not have provision for deciphering them.

WINDOWMATIC has been produced with the intention of rectifying these shortcomings and to bring out the very best from VIEWSHEET.

WINDOWMATIC provides a quick and easy way to configure screen and printer allowing complicated documents and reports to be set up much more easily. It displays complete text information on all 20 windows and accurate graphic representation of the screen and printer output.

The package includes a screen dump routine for Epson printers and allows use of other printer dump packages.

WINDOWMATIC is compatible with BBC Master and BBC B + . A 6502 2nd processor must be fitted to a model B to run Windowmatic. Windowmatic is fully compatible with Turbo and 6502 2nd processor.

The program is supplied on disc with a comprehensive manual.

VU-TYPE

Do you have finger trouble when typing?
Do your letters look like this?
Dear Sor,
I wuold like to .....
then you need:
VU-type, a complete touch typing program produced by BBC/Pitman.
It allows you to learn at your own pace and has a wide range of exercises. Screen displays show the keys you have pressed and it will report on your speed and accuracy.
Supplied on a 40T Disc with a manual.
Available at a special price of £7.50(d)
instead of the usual £15. Offer valid while stocks last

EDUCATIONAL/FUN SOFTWARE BUNDLE

Wordmover
Wordplay
Pantry Antics
Drawstick
Locomotion

These programs are supplied from the BBC Publications Educational Software range and will be supplied on a 5.25" disc for BBC Master, B + and B and on a 3.5" disc for the Compact.

5.25" Disc £17.50(d)
3.5" Disc £18.50(d)
(Normal RRP over £40)

BOOKS

No VAT Carriage Code (c)

LANGUAGES
6502 Assy Lang Prog......£19.95
6502 Programming......£13.95
8086 Book......£23.95
Acorn BCPl User Guide......£15.00
Acorn FORTH......£7.50
Acorn LISP......£7.50
Acorn ISO Pascal Ref Manual......£10.00
Intro to COMAL......£10.00
Intro to LOGO......£7.50
Micro Prolog Ref Manual......£10.00
Introduction to Turbo Pascal......£14.95
Prog the Micro with Pascal......£8.50
The Supervisor's BBC Micro......£10.95

BBC MICRO GUIDE BOOKS
Inside Information......£8.95
Maths Prog in BBC Basic......£7.95
The Friendly Computer Book......£4.50
Toolbox 2......£10.95

PROGRAMMING/UTILITY
Advanced Sideways Ram User Guide......£9.95
Advanced User Guide (BBC)......£15.95
Applied Assembly Language on the BBC......£9.95
BBC Micro Advance Programming......£9.95
BBC Micro Ref Guide (B Smith)......£10.95
BBC Micro Sideways ROM's RAM's......£9.95
Guide to the BBC ROM......£9.95
Beginners Guide to W.P......£7.95
Mastering Assembly Code......£8.95
Mastering Interpreters & Compilers......£14.95
Mastering View, Viewsheet & Viewstore......£12.95
View by B. Smith......£12.95
View 3.0 User Guide......£10.00
Viewstore User Guide......£10.00
Viewsheet User Guide......£10.00
Wordwise Plus......£9.95

SOUND & GRAPHICS
Computer Graphics & CAD Fundementals......£9.95
Mastering Music......£6.95

DISC DRIVE SYSTEMS
Advanced Disc User Guide......£16.95
Disc Book......£3.50
Disc Programming Techniques......£7.95
Disc Systems......£6.95
File Handling on the BBC......£6.95
Discovering Disc Drives......£POA
Practical Disc File Techniques......£5.95
Mastering the Disc Drive......£7.95
Mastering DOS plus......£12.95

APPLICATIONS
Interfacing Proj for BBC......£6.95
BBC and Small Business......£5.75
The Software Business......£5.50

Master Operating System (David Atherton)......£12.95

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE
17 Burnley Road, London NW10 1ED Tel: 01-208 1177
305 Edgware Road, London W2 Tel: 01-723 0233

NOVACAD

Computer Aided Draughting for the BBC Micro

" Novacad can drive a plotter to provide drawings of a high quality… Novacad is excellent. It is flexible, genuinely easy to operate without much practice, and a pleasure to use. " **Beebug December 1986**

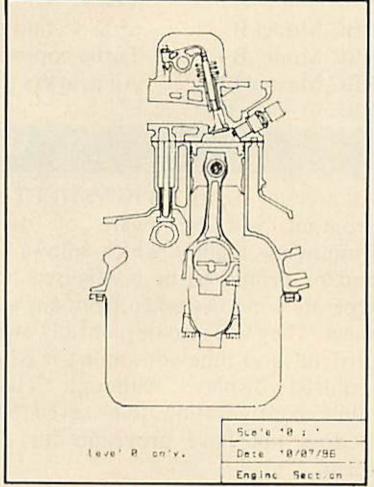
" Novacad is a professional package, well worth the £90 for the ROM and disc and is expandable to suit your own particular requirements. I would have no reservations if I heard Novacad called, "the best on the market". " **A&B Computing August 1986**

A sophisticated CAD package with unique facilities which are generally confined to the professional CAD packages costing thousands of pounds.

NOVACAD is being used in widely differing fields ranging from leading British industries for producing engineering drawings to Accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing professional quality output are making extensive use of NOVACAD's unique features. NOVACAD is proving to be a invaluable teaching aid in technical schools and colleges simply because of the ease with which it can be used.

NOVACAD'S MAJOR FEATURES

* Simple and easy to use with logical command sequence.
* A large drawing area (approx 15 screens).
* The ability to create complex icons (upto 500 lines instead of the usual 15 to 20 pixels), store them in a library and recall them at different scales and orientations.
* A zoom facility allowing magnification of up to 20 times to insert finer details.
* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique optional facility to output to any BBC compatible plotter.
* Cursor control from keyboard, tracker ball or mouse.



NOVACAD package includes a 16K ROM, Utility disc and a comprehensive manual.

MINIMUM HARDWARE REQUIREMENTS

- **Any BBC range computer with Acorn DFS.**
- **40 Track single sided single drive.**
- **Epson compatible dot matrix printer.**

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.

6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.

ROUTCAD, an optional software package for our Graphics Workstation allows for production of shapes drawn using NOVACAD in 3D on suitable material and is ideal for a range of applications including template making and model building.

EpromRyter

A powerful eprom programmer for use with the BBC Master. It offers the latest 'state of the art' programming techniques to provide fast and efficient operations.

The software is totally menu driven and on screen help messages make the programming simple for both specialists and novices alike.

The EPROMRYTER interfaces with the Master through 1 MHz bus. It is mains powered with its own psu. 3M Textool zif socket has been fitted to ensure consistent and reliable service over long periods.

The single rail eproms handled by the EpromRyter are:
- 2716 2732 2764 27128 27256 27512 27513 27011 2516 2532 2564 (NMOS & CMOS)
- One time eproms P27XXX, 87CXXX etc.
- Also A suffix eproms such as 27XXXA

The main features of the programming software are:

* Device, function and voltage selection from the computer keyboard.
* Continuous display of the options selected.
* All eproms upto 27512 (64K) programmed in single pass.
* Automatic Intelligent identifier support for eproms able to respond.
* Selectable programming voltage 25/21/12.5V
* 3 programming methods: Normal, Intelligent & Pulse (20 sec for a 27128).
* Serial port protocols supported.
* DFS, NFS, ADFS and Rom Filing System Supported.
* BASIC/Machine Code programming using RFS.
* Powerful editor with input in HEX or ASCII. * Full editable 64K file.
* Block move of data within the address range.
* User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
* Multiple loading for ROM Filing System

Some of the above features apply to Master Computers only

EPROMER II

A proven Eprom programmer for BBC Model B and B+ with thousands in use in industry, educational and R&D establishments. It offers many of the powerful features of the EpromRyter and can program all single rail eproms upto 27256. Full details on request.

TECHNOLINE
(24 hr viewdata system)
Tel:01-450 9764

MAIL ORDER
17 Burnley Road
London NW10 1ED
Telex:922800

RETAIL SHOPS
15 Burnley Road, London NW10 1ED
Tel:01-208 1177 Telex:922800
(close to Dollis Hill ⊖)
West End Branch
305 Edgware Road, London W2
Tel:01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Acess Card

Orders welcome from government depts & educational establishments

All prices ex VAT.
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

Back by customer demand Technomatic's 20Mbyte Winchester Drive



* Cased with power supply and cooling fan
* 1 MHz bus extension cable
* Fully compatible with Acorn ADFS and FS III
* Fully compatible with S.J. Research file server
* 12 months warranty

Only £499 (a)

(This offer valid whilst current stocks last)
Special Adaptor for S.J. Research File Server **£28**



FREE MASTER OFFER

Every Master and Master Compact purchased at our usual price will include the following:
An educational/fun bundled software package comprising of:

VU-Type, Wordmover, Wordplay, Drawstick, Locomotion and Pantry Antics

$3\frac{1}{2}$ DISC DRIVES

* 400K/640K capacity per drive in DFS/ADFS modes
* Mitsubishi 80 track double sided ultra low power, fast access mechanisms
* The drives are supplied fully cased and with cables ready for connection to a computer
* Drives powered from the computer * 2 years warranty

Single Drive £75(b) Dual Drive £134(b)

META Version III

"All the good features you would expect to find in a good source code editor are present . . . Meta assembler lives in a different world. It is structured to work with any new processor . . . as new instruction sets can be added . . . as needed . . . has a well featured editor with colour highlighting, a sound modular approach." **Acorn User October 1986**

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc — and 68000 — using native mnemonics for each processor, eg. LD A, (HL) for Z80 and MOV AO, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassemblers.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc — all **during Assembly.**
- Over 50 directives included as standard: handling nestable macros, conditional assembly and twenty types of table definition directives.
- 32 bit labels; 31 character names. Arithmetic and Boolean arithmetic to 32 bits.
- Modular source code with numeric and string parameter passing.
- Serial communicator area with eight options lines: echo, control code trap, LF supression/addition etc.
- Over 500 in use throughout the world in universities and many different industries.
- Two 16K Roms, two 80 track discs, A4 ring-band manual, function-key strip.

PORTAL EPROM EMULATORS

- Emulates 2716, 2732, 2764, 27128, 27256, 27512 eproms at 150ns Access time.
- Load at 4Kbytes/second — No "erase" time.
- 28 pin header plugs into Eprom socket on target system — status monitored on 13 Leds.
- Fully software controlled from Meta Assembler.
- 100 times faster than standard EPROM program/erase cycle.
- Fully CMOS compatible; draws no power from target system.
- Four portals may be independently programmed off same user-post cable.
- Complete with all cables, manual and disc.

PORTAL 512 (2716, 2732, 2764, 27128, 27256, 27512).

TEAM DISSASSEMBLER

The third part of the Universal Development System: a Meta labelling dissassembler.

Supports 1802, 8080, 8085, HD64180, Z80, 65XX (includes 65 col, 6511 etc), 68XX (includes 00, 01, 02, 03, 08 etc):

- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
- Pre-editing stage allows marking of object code areas as byte, string, word, long word etc, tables. These areas dis-assembled into appropriate directives instead of garbage mnemonics.
- Reconstituted source code ready for immediate re-assembly by META.
- Omniversal search/replace for re-naming arbitary label names with meaningful ones.

IT'S NEW, IT'S FREE! THE TECHNOMATIC BBC CATALOGUE

This advertisment can only show an example of the range of products stocked by Technomatic. That's why you should send for our latest BBC catalogue providing detailed information and prices on BBC Computer Systems, Peripherals, Software and Books.
Technomatic is a BBC Computer and Econet Referral Centre providing a professional and reliable service to the BBC user.
To obtain your free copy please complete and return the coupon below.

NAME..

ADDRESS...

....

...............................Post Code...

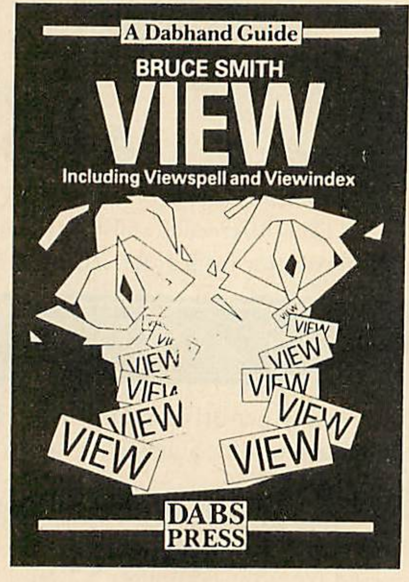
9/87

Return to Technomatic Ltd, 17 Burnley Road, London NW10 1ED

VIEW GUIDE

AU OFFER

Bruce Smith's Dabhand book



Bruce Smith has covered all aspects of wordprocessing in this comprehensive guide to *View*.

The 240-page book covers: Command and Edit mode, Rulers and Margins, Saving and Loading text, Boot files, Markers, Formatting and Justification, Search and Replace, Stored Commands, Page layout, Printer Drivers, Macros, Handling Long Documents, Hints and Tips, *View* Manager, Machine Code utilities, *ViewSpell*, *ViewIndex* and OverView, Utility programs, *View* version changes, Quick reference, Printer Control codes and Technical notes. Applicable to the BBC B, B+, Master 128, Compact and Electron.

Please send me·

______ copies of *View A Dabhand Guide* at £12.95 (including p&p)

______ copies of book and 5.25-inch disc at £16.95 (£1.00 Discount)

______ copies of book and 3.5-inch disc at £17.95 (£2.00 Discount)

I enclose a sterling cheque/PO payable to Dabs Press for £_____ (outside the UK add £2 p&p)

NAME ______

ADDRESS ______

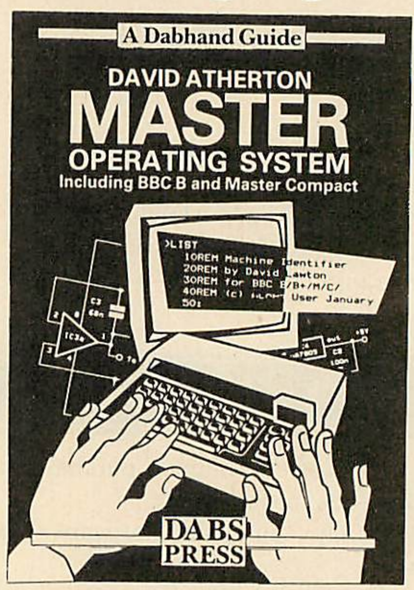
POSTCODE ______

Send this coupon with your remittance to Dabhand, Acorn User Merchandising, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.

MOS GUIDE

AU OFFER

Guide to Master operating system



This new book from Acorn expert David Atherton, is the definitive reference work for programmers of the BBC model B+, Master 128, and Compact computers. It also contains much a considerable amount of useful material for BBC model B and Electron users.

It covers all features of the Acorn MOS including 65C12 opcodes (including Rockwell additions), all new system calls and previously unpublished filing system notes.

The book is liberally sprinkled with program listings, which are available on disc. The *Programs Disc* also contains some extra utilities.

Please send me:

____ copies of *Master Operating System: A Dabhand Guide* at £12.95 each.

____ copies of book and 5.2-inch disc at £16.95 (£1.00 discount).

____ copies of book and 3.5/inch disc at £17.95 (£2.00 discount).

I enclose a sterling cheque/PO payable to DABS PRESS for £____ (Outside UK add £2 p&p. Free p&p in UK).

NAME ______

ADDRESS ______

POSTCODE ______

SIGNED ______ DATE ______

Send this coupon with your remittance to **MOS Offer, Acorn User, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.**

Please allow 28 days for delivery.



Computaccount (UK) Ltd
21 Spring Hill
Birmingham B18 7BH
Tel 021 236 3455

We are major supplier to the educational and health sectors

Please send an SAE for our free extensive catalogue and price list. Hundreds of products listed at excellent prices.

ARCHIMEDES

HIGH PERFORMANCE COMPUTER SYSTEM

Call for details on 300 series and 400 series systems

ACORN

NEW MASTER COMPACT series. Standard system is 128K, single 3.5 inch drive, bundled software.

Compact entry system £295.00
Compact TV system £299.00
Compact with mono monitor £329.00
Compact with colour monitor £465.00
RS 232 interface for compact £26.00
Extra 3.5in drive for compact £99.00
PAL TV adaptor for compact £26.00

Master 128 .... £379.00
Master ET £309.00
Master econet module £43.47
Turbo upgrade £108.00
64K upgrade kit £34.74
Master 512K upgrade £199.00
10 Mbyte Hard disc with fileserver £1086.95
30 Mbyte Hard disc with fileserver £1608.95
Eprom cartridges £11.95
Acorn DNFS kit £95.00
ADFS ROM £26.04
ATPL Sideways RAM/ROM board £39.00
CONCEPT Keyboard £124.95
View manual £10.00
Viewsheet manual £10.00

ACCESSORIES

LISTING PAPER
All standard sizes available at very competitive prices. Single and multi-part.
LABELS
Various size, 1-across, 2-across, 3-across
RIBBONS
for most common printers, Epsom, citizen, Star, Amstrad, Juki, Canon etc.
CLEANING KITS
For UDU, disc drives and keyboards

DISCS

Full range of 3", 3.5" and 5.25" discs available at very competitive prices.

AMX

Please state whether for BBC or Master
AMX mouse with Super Art ROM £78.00
Pagemaker £43.43
Paintpot £13.00
Desk £21.70
Super Art ROM £43.43
Database £21.70
3D Zicon £21.70
Utilities £13.00

ROM SOFTWARE

Acorn:
View 2.1 .... £45.00
View 3.0 .... £63.00
ViewPlot (Disc) £25.75
ViewSpell £33.50
Viewsheet £45.00
Viewstore £45.00
GXR (please state whether for B or B+) £23.00
ISO Pascal £52.00
LISP £39.00
BCPL £46.00
Logo £52.00
ADFS £26.04
Computer Concepts:
Wordwise Plus £40.00
Printmaster £25.00
Accelerator £48.00
Speech ROM £27.50
Communicator £51.30
Interword £48.00
Intersheet £48.00
Interchart £28.50
Interbase £59.00
Spellmaster £46.00
Beebugsoft:
Toolkit Plus £33.00
Wordease £25.00
ICON master £29.00
ROMIT £29.00
Help II ROM £27.00
Sleuth ROM £27.00
Exmon II £28.00
Spellcheck III £32.00
MUROM £24.00
Pace:
Commstar £29.57

COMPACT SOFTWARE

Revs 5 .... £16.95
Hits 1/Hits 2 .... £12.95
Pascal £59.00
Citadel £12.95
Repton 2 .... £12.95
Karate Combat £12.95
Strykers Run/Enhanced Strykers £12.95
CrataForce £12.95

FLEA MARKET

All items subject to availability

EPROM programmer £40.00
Programming software (ROM) £5.00
EPROM eraser £24.00
1200/75 Modem + Comm software £35.00
Torch Light Pen £25.00
Plannercalc. Torch CPN format £35.00
Masterplanner. Torch CPN format £85.00
IBM user manuals (installation/Basic) £15.00

MONITORS

Mono:
Sanyo DM4112 .... £75.00
Philips green Hi-res 7502 .... £76.00
Philips amber Hi-res 7522 .... £82.61
Zenith green Hi-res 1230 .... £85.00
Zenith amber Hi-res 1220 .... £85.00
Colour:
Microvitec std-res 1431 .... £191.00
Microvitec med-res 1451 .... £229.00
Microvitec hi-res 1441 .... £399.00
Philips 8533 RGB Med-res + composite video £251.00
Monitor cables (state types required) £3.50
Monitor bridge single height £14.90
double height £18.90

PRINTERS

DOT MATRIX
Epsom LX800 *NEW* 150 CPS NLQ £219.00
Epson FX800 .... £324.75
Epson FX1000 .... £453.75
Epson EX800 (optional colour) £457.88
Epson EX1000 (optional colour) £614.63
Epson LX80/86 tractor unit £20.00
Epson LQ 800 180 cps 24 pin matrix NLQ £479.00
Epson LQ 1000 180 cps 24 pin 132 col NLQ £659.00
Olivetti DM100 80col NLQ 120cps £225.00
Olivetti DM280 80col NLQ 160cps £349.00
Canon PW1080A NLQ 80col 160 cps £258.00
Brother 1109 Par. + Ser. 100cps + NLQ £209.00
Brother 1409 Par. + Ser. £349.00
Brother 1509 Par. + Ser. 180cps + NLQ £449.00
Brother 2024 Par./Ser. NLQ 24pin 160cps £750.00
STAR. Full range stocked. Call for prices
Star NL 10 serial NLQ 80 col 120cps £279.00
Star NL 10 parallel NLQ 80 col 120cps £239.00
Star NX15 NLQ 132 col 120 cps £330.65
Star SD10 NLQ 80 col 160 cps £330.65
Star SD15 NLQ 132 col 160 cps £415.65
Star NB 2415 NLQ 24 pin 216 cps £645.15
Star NB15 NLQ 24 pin 300 cps £806.65
Citizen 120D parallel 120 cps NLQ 80col £199.00
Citizen LSP10 120cps Eps/IBM comp NLQ £225.00
Citizen MSP10E 160cps Eps/IBM comp NLQ £296.00
Panasonic KX-P 1081 .... £159.00
Panasonic KX-P 1090 .... £233.00
Panasonic KX-P 1092 .... £315.00
Panasonic KX-P 1592 .... £405.00
Micro-P MP165 NLQ £208.70
Micro-P MP200 ★NEW★ £299.00
Parallel printer cable BBC £9.00
Parallel printer cable IBM, etc from £15.00
Epson GQ3500 LASER 6 pgs/min £1795

DAISY WHEELS
Sanyo PR3000 .... £199.00
Sanyo PR5200 .... £299.00
Brother HR10 .... £239.00
Brother HR15 .... £349.00
Brother HR25 .... £650.00
Brother HR35 .... £825.00
Juki 6100 .... £279.75
Juki 6200 .... £454.00
Juki 6300 .... £694.00
Juki 2200 typewriter/printer £238.00

PRINTER ACCESSORIES

Epson FX 80/85 Tractor Unit £32.00
Epson FX 80/85 Sheet Feeder £125.00
Epson FX100/105 Sheet Feeder £139.00
Brother HR sheet feeder £209.00

Epson MX/RX/FX 80 Ribbons £3.75
Epson MX/RX/FX 100 Ribbons £4.50
Canon PW1080/1156 Ribbons £5.00
Taxan Kaga KP810 Ribbons £5.00
Citizen printer ribbons £3.99
All Epson Spares available .... £POA

Massive range of other compatible ribbons available

AMSTRAD

NEW PC 1512: Prices start at £449 for basic single drive + mono monitor system. Phone for prices of other systems.
PCW 8256 .... £399.00
PCW 8512 .... £499.00
2nd disc drive for PCW8256 .... £155.00
Serial interface for PCW £59.00
Modem with Chit Chat software £169.00
Wordstar deluxe £60.00
Supercalc £43.00
Sagesoft Popular Accounts Plus £130.00
Dbase II £103.00
3 inch discs for PCW's £3.50

DISC DRIVES

Opus 5802 400k DS 40/80 track £109.00
Opus 5802DB dual 400k DS 40/80 track £205.00
Opus 5802D dual 400k DS 40/80 with PSU £233.91
Opus DDOS kit £52.12
Pace PSD1P 100k 40T with PSU £125.00
Pace PSD3P 400k 40/80T with PSU £144.00
Pace PDD3P dual 400k 40/80T with PSU £260.00
Akhter MD802E dual 400K DS 40/80T mounted in monitor stand £285.00
Cumana CSX100 100k SS 40T ... £99.00
Cumana CS100 100k SS 40T with PSU £129.00
Cumana CS400S 400k DS 40/80T with PSU £152.00
Cumana CD800S dual 400k SS 40T with PSU £295.00
Cuman CS354 SS 3.5" with PSU £121.70
Cuman CD358 DS 3.5" with PSU £210.00
Cumana CCD2000S 3.5"+5.25" with PSU £282.17

MODEMS

Nightingale with Commstar £135.00
Voyager 11 .... £99.95
WS 2000 .... £108.69
Modem 1000 (BT approved) Special Offer £35.00

NEW TORCH RANGE

Z80 processor board with software £229.00
Twin floppy drive unit £283.00
Both above combined at £459.00
20 MB Hard plus one floppy unit £826.00
40 MB Hard plus one floppy unit £1125.00

Massive range of torch software available.

SPECIAL SOFTWARE

Torch Turbo Library – Special functions & procedures for Turbo Pascal to access the power of BBC/Torch facilities.
Newnet – Powerful friendly Torchnet Management software with password protection, etc.

dBASE SPECIAL

dBase helper programme now available for those who do not want to learn programming in dBase, but need the powerful facilities quickly.
Price only £40.00

HOW TO ORDER

Payment by cheque to:
COMPUTACCOUNT (UK) LTD

Carriage: Items less than £50: £2.50: £50-£100: £4.50
Carriage and insurance on items more than £100: £9.50

NAME ....
ADDRESS ....

Quantity	Item	Price	
....	....	£..........	£..........
....	....	£..........	£..........
....	....	£..........	£..........

Please add VAT at 15% to Total, including Carriage.

Send to Computaccount (UK) Ltd., 21 Spring Hill, Birmingham B18 7BH or telephone 021 236 3455 TOTAL £..........

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England

Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989

BY POPULAR DEMAND OUR SHOP IS NOW OPEN UNTIL 8PM EVERY THURSDAY

All prices exclusive of VAT; subject to change without notice & available on request.

Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn — The choice of Experience



The choice after the Experience

BBC MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMULATOR — £395

BBC MASTER with Turbo Board — £493

512K Processor Add on Board "inc. Mouse and GEM package" — £195

BBC AIV (Domesday) System — £3479

SPECIAL OFFER

FREE . . . £65 worth of Software

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control and ***Watford's*** *unique VIEW PRINTER DRIVER ROM – an essential tool for all users of the Master's built-in VIEW wordprocessor; with every Master purchased from us.*

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£99
BBC MASTER ET (Econet Terminal)	£315
Econet Module for the Master	£43
Twin ROM Cartridge for Master	£8
Quad ROM Cartridge for Master	£12
Universal Processor Adaptor	£75
Reference Manual I	(No VAT) £14
Reference Manual II	(No VAT) £14
Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£42
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
Z80 Acorn 2nd Processor package	£325
ARIES' Professional IEEE Interface	£238
Acorn IEEE Interface Complete	£265
Acorn Teletext Adaptor	£95

BBC MASTER COMPACT

All Master Compact Microcomputers are supplied complete with an integral 3½" Disc Drive and various educational and professional bundled softwares.

System 1	Standard Package	£349
System 1A	System 1 + TV Modulator	£363
System 2	System 1 + Green Hires Monitor	£399
System 3	System 1 + Medium Res Colour Monitor	£549

RS232 Kit for BBC Compact — £26

Additional 3½" Drive for BBC Compact — £99

(Securicor carriage £7)

The 80186 Co-Processor

This package consists of the Master 512 board, Watford Co-Pro Adaptor, Acorn 1770 Disc Upgrade and Acorn ADFS. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

£275

ARCHIMEDES

Acorn's New range of BBC Micro based on RISC Technology

Model 305

- Basic System — £799
- with Green Monitor — £849
- with Colour Monitor — £999

Model 310

- Basic System — £875
- with Green Monitor — £925
- with Colour Monitor — £1075

VARIOUS PRINTERS & ACCESSORIES

- FX80/85 Tractor Feed — £35
- Hi-80 Refils, set of 4 Pens — £7
- EPSON Paper Roll Holder — £17
- EPSON LX86 Printer — £189
- EPSON LX80/86 Tractor Feed — £20
- EPSON LX80/86 Sheet Feeder — £49
- EPSON LQ800 Printer — £429
- EPSON LX800 Printer — £210
- EPSON FX800 Printer — £315
- EPSON FX1000 Printer — £439
- EPSON EX800 Printer — £405
- Colour option for EX800/1000 — £55
- EX Colour Ribbon — £18
- EPSON LQ800 Printer — £439
- LQ800 Tractor Feed Attachment — £39
- FX/LX800 Single Sheet Feed — £139
- FX/LQ1000 Single Sheet Feed — £149
- HR15 Brother RS232 Daisy Wheel — £275
- HR20 Brother Daisy Wheel Printer — £349

(Securicor carriage charge on printers £7)

PRINTER SHARERS

(Ideal for School environment)

Connect 3 BBC Micros to 1 Printer — £60

Connect 6 BBC Micros to 1 Printer — £99

PRINTER CHANGER

Connects 3 Printers to 1 Micro — £65

(Cables extra, specify type required when ordering)

65C102 2nd PROCESSOR

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B.

£139

SPECIAL OFFER

EPROMs for BBC's Sideways ROMs.

2764-250nS £3.50

27128-250nS £3.75

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £2.70

2 × 6264LP (16K) £5.30

KAGA/TAXAN PRINTERS

(IBM/Epson compatibles)

Kaga KP815 Printer	£269 (carr £7)
Kaga KP915 Printer	£350 (carr £7)
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

RS232	£27	RS232 + 2K Buffer	£55
IEEE 488	£65	RS232 & 8K Buffer	£75

PRINTER LEADS

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£12

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Brother HR15/HR20	£3.00	£5.00
FX100	£7.00	-
FX80-MX80-FX85	£4.50	£4.95
RX80	£4.50	£4.50
LX80	£4.00	£4.50
LQ2500	£9.00	-
Centronics GLP	£4.00	£3.75
KAGA KP810	£5.25	£4.75
Panasonic KX1080/81	£4.50	£4.75

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

1,000 Sheets 9½" × 11" Fanfold Paper	£7
2,000 Sheets 9½" × 11" Fanfold Paper	£12
1,000 Sheets 15" × 11" Fanfold Paper	£9
1000 Sheets true A4 Fanfold Paper	£11
2000 Sheets true A4 Fanfold Paper	£21
Teleprinter Roll (Econo paper)	£4

Carriage on 1,000 Sheets £1.50

PRINTER LABELS

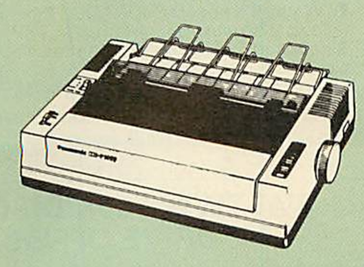
(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	£5.00
1,000 90 × 36mm (Twin Row)	£4.90
1,000 90 × 49mm (Twin Row)	£7.50
1,000 102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

Panasonic KX-P1081

(Now IBM/Epson Compatible)



Available NOW at a superbly realistic price, the KX-P1081 perfectly balances features, quality of construction and Value for Money to produce the printer of tomorrow, here today, ready to sweep the current generation of machines away.

Ingenious innovation in terms of software control codes permits great flexibility when it comes to defining the print style. A nippy **120 cps** of clear Draft text backs up the crisp 24 cps Near Letter Quality text mode, with upto 40 superbly useful downloadable characters. A delightful range of assorted character widths is efficiently supported, with sizes ranging from a broad 5 cpi to petite 17 cpi, EVEN in NLQ mode. Some of the extensive support for serious use includes specialised functions to perform justification, centering and even left and right ranging. Proportional spacing permit even greater freedom when it comes to advanced use. Not only is the full Epson RX compatible control code set implemented, but extra codes have also been added to cater for the NLQ options, etc.

A full 96 ASCII character set is supported, with an extended set of 32 international characters and IBM special characters as well as IBM block graphics characters. A 1K Print Buffer alleviates much of the wait time normally associated with printing, whilst the bi-directional logic seeking print head takes the quickest route to print as required.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£155** (carr. £7)

Optional RS232 Interface: **£39**

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional. logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A printer of similar spec could cost a lot more than our ridiculously low price of:

Only **£245** (carr. £7)

Single Sheet Feeder	£195
Tractor Feed	£90
Spare Ribbon	£3.00

Acorn-Olivetti JP101 Ink Jet Printer

One of the main problems with most printers is that they are hopelessly noisy. How often have you wanted to print something late at night but not done so for fear of waking the children? Also ideal for those working in quiet environments such as libraries, etc. Silence the complaints with the serious solution from Watford at the amazing cost of only **£59**

(Offer valid while present stocks last)

JP101 accepts 9½" standard fan fold paper or single A4 sheets. Tractor & Friction feed supplied as standard – print speed 50 cps.

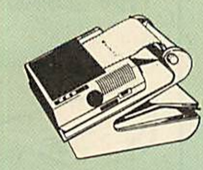
Pack of 4 refills **£10**

Screen Dump ROM for JP101 £10

Anti-Glare VDU Screen

This extremely effective, easy to install, 12" *VDU screen eliminates harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users.* **£12**

Printer Stand Type-YU-S25



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

£34



We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop. All Monitors are supplied complete with connecting lead.

MICROVITEC 14"

- 1431 – Medium resolution as used on the BBC television computer programme **£175**
- 1451 – High resolution, suitable for word processing in mode 0 **£225**
- 1441 – High res, exceeds the capabilities of the BBC micro **£359**
- 1431AP RGB + PAL and AUDIO **£199**
- 1451AP RGB + PAL and AUDIO **£255**
- Dust Cover for Microvitecs **£5.50**

KAGA-TAXAN 12"

- TAXAN KX117 Hi-res Green Monitor **£80**
- TAXAN KX118 Long persistence Hi-Res Green Monitor **£90**
- TAXAN KX119 Ultra-Hi-Res Amber Monitor **£90**
- TAXAN Super Vision 2 **Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing **£269**
- **TAXAN Super 3, Type 625** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue **£319**

STAR BUY

- **PHILIPS 14"** Hi-Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono connectors. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display.

ONLY £209

ZENITH

"Test Bureau Recommended for use in Education"

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith PC Systems.)

Green (New Design) Hi-res	£69
Amber (New Design) Hi-res	£74
LEADS	
BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for KAGA	£3

N.B. carriage on Monitors **£7** (securicor)

SWIVEL BASES

for Video Monitors

By placing your monitor on one of our superb swivel bases, you gain the freedom to adjust the monitor viewing angle to suit your needs. By doing this, you alleviate eye strain and reduce back stress. Front adjustable without lifting the monitor.

for 12" Monitors **£10** (carr. £2.50)
for 14" Monitors **£14** (carr. £2.50)

MEGABUFFER 256



This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £2)

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.

Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.

With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.

To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.

Master owners may use Co-Pro to add a second Co-processor externally.

Watford, brings power to your BBC at only:

£50.00 (carr £5)

Continued


THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED (BOOK)

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, Canon PW1080A or any Epson FX80 compatible Printer with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities ten simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for four years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS). (not Acorn's 1770 DFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£58**
- *Acorn's 0.90 DFS Kit complete* **£55**
- *DFS Manual (Comprehensive)* (no VAT) **£6.95**
  (P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs).
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics and their appointed dealers only. Every ROM carries a special label with LOGO and serial number.*

NEW WATFORD's Mk II Double Density DFS INTERFACE

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our DDFS board has been adapted to allow the use of Acorn ADFS.

Added features include:
- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

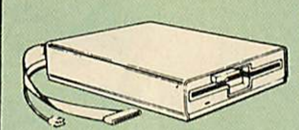
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only £30.00.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your Existing Single Density DFS for our DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

SPECIAL DISC DRIVE/DDFS OFFER

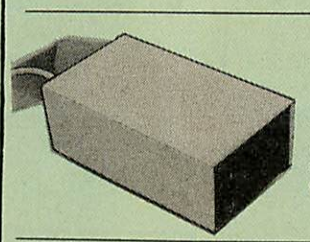
Type CLS400



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular DDFS Disc Interface (allows 720k storage). Will run in both Single and Double Density modes 40/80 track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks last)

3½" TWIN 800K DISC DRIVE OFFER



These top quality 3½" Disc Drives are attractively finished in BBC beige and are supplied complete with Cables. They run directly from the BBC B/Master's own PSU.

Special Offer **£126**

DISC DRIVE SHARER

(Ideal for educational establishments)

At last, a low cost alternative to the econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disc, and red means that you are next in line.

The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not compatible with ADFS.)

Launch Price: **£59** (Price includes 3 Cables)

MYSTERIES OF DISC DRIVES & DFS REVEALED (BOOK)

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

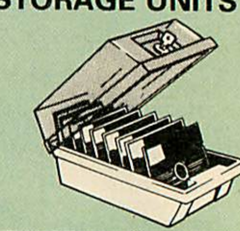
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£8

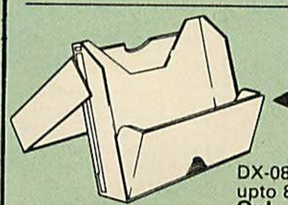
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection –
Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** – holds upto 50 5¼" discs **£8**
- **M85** – holds upto 95 5¼" discs **£10**
- **M50** – holds 50 3½" Discs **£10**

PLASTIC LIBRARY CASES



◀ Holds up to 10 5¼" Discs. **Only £2.00**

DX-08: This extremely handy unit holds upto 8 5¼" Disc while in use. **Only £2.00** ▶

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

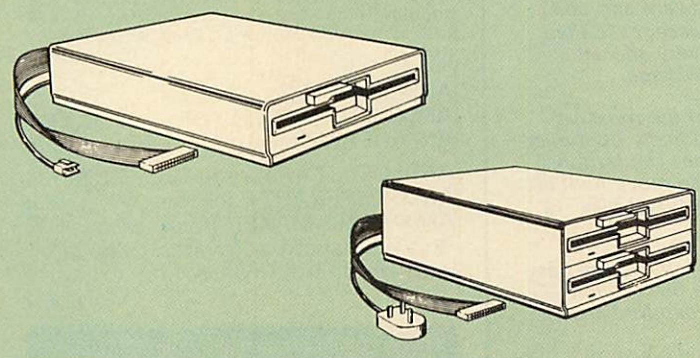
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £95		CS 200 £108	
400K (720K)	CLS400S £96	CLD 400 £180	CS 400S £109	CD400 £200
800K (1.44M)		CLD 800S £183		CD 800S £204

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased drive, Less power supply unit, Single 5¼" 400K unit, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes* ***£9***
- *10 × 5¼" D/S D/D 40 Track Diskettes* ***£11***
- *10 × 5¼" S/S D/D 80 Track Diskettes* ***£13***
- *10 × 5¼" D/S D/D 80 Track Diskettes* ***£13***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£28***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£18***
- *10 × 3½" D/D D/D 40/80 track Discs* ***£22***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 × **M3** 3½" D/S D/D 80 Track Discs* ***£18***
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* ***£7***
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* ***£9***
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* ***£11***
- *3" Double Sided Discs* ***£3 each***

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£39	£43	£65
● With Sleeves	£43	£45	£68

ACORN WINCHESTER DRIVES

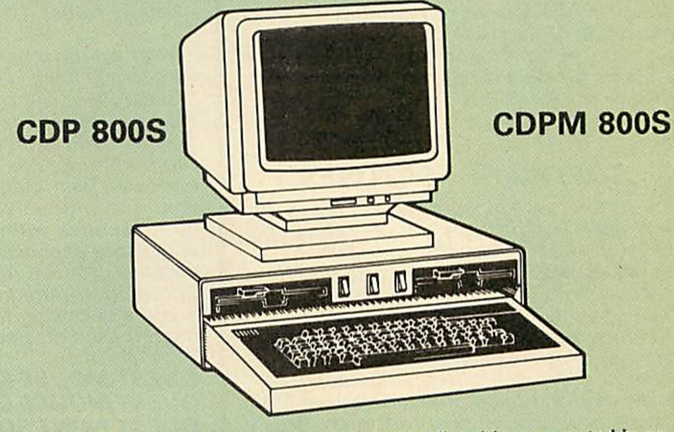
Supplied complete with Level 3 Econet File Server software.
10 Megabytes **£1050; 30 Megabytes £1549**

WATFORD's WINCHESTER DRIVES



- 10 Megabyte Unit with ADFS **£399**
- 20 Megabyte Unit with ADFS **£499**
- 40 Megabyte Unit with ADFS **£999**

CDP 800S CDPM 800S



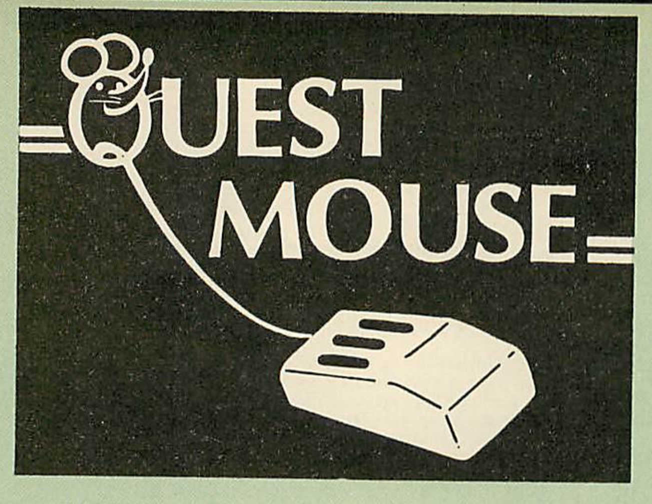
Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £204 **CDPM 800S for Master £210**
(Securicor Carr. £7)

ACORN'S Twin 800K Disc Drives

Specially mounted side by side in a Master Plinth. Supplied complete with Cables. Plugs directly to the Master Computer.

RRP ~~£250~~ **Our Price: Only £189** (carr £7)



QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and is smooth and easy to use on most work surfaces. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that programs such as AMX Pagemaker etc, will work with it.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87
"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."
"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87
"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87
". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package. . ."

". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."
"Quest Paint is a major leap forward in BBC programming. . ."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

QUEST MOUSE & QUEST PAINT	***£59***
QUEST MOUSE ONLY	***£30***
QUEST PAINT SOFTWARE	***£34***
QUEST FONT DISC	***£12***

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 24 text FONTS for use within Quest Mouse.
P.S. There is no need to worry about any of your existing AMX mouse software. The Quest Mouse is totally AMX compatible so it will work with any of the AMX range of software.

All prices in this advert are exclusive of VAT.

MARK II LIGHT PEN + PENPAL 2

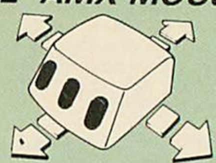
Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.
Penpal II, Watford Electronics' sophisticated light pen software is also supplied free on cassette or disc (please specify). This is a highly sophisticated drawing package enabling you to gain the maximum benefit from your Light Pen. The software is used to edit Mode 2 full colour screens using lines, patterns and you own designs. Screens may be saved to cassette or disc.

Price Only £18



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

THE AMX MOUSE



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £59 (carr £1.50)
(Please specify for BBC or Master Computer)

We are giving away, absolutely **FREE**, our popular Colour Art software package worth **£15** with every AMX Mouse package purchased from us.

AMX MAT	**£5**
AMX MOUSE ONLY	**£29**
AMX DESK Package	**£19.00**
AMX UTILITY Package	**£11.00**
AMX SUPERART Package	**£39**
AMX PAGE-MAKER Pack – A desk-top publishing software. It Works with keyboard, joystick and a mouse	**Only: £32**

We are giving away, absolutely FREE, PAGE-FONTS, a disc containing over 20 fonts, with every purchase of AMX PAGE-MAKER from us.

PAGE-FONTS Over 20 fonts for use with AMX PAGE-MAKER	**£9.50**
EXTRA EXTRA	**£19**
AMX DESIGN (ROM)	**£69**
AMX 3D ZICON Disc	**£19**
AMX Database Disc	**£19**
AMX XAM Educational	**£19**
AMX MAX A gem of desktop (ROM)	**£17**

RB2 MARCONI TRACKER BALL

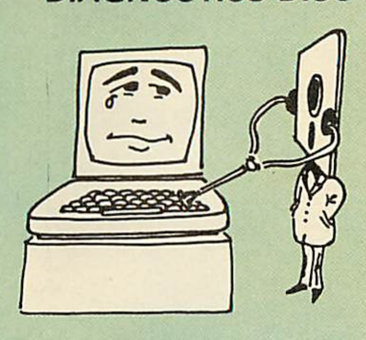
Complete with Software Disc	£59
RB2 + Software Disc + Quest Paint	£85

FLEET STREET EDITOR

Software pack **£35**

Admin Xtra Disc Utility	**£13**
Walt Disney Disc Utility	**£13**
Fonts N Graphics Disc Utility	**£13**

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Cassette). 4 primary level maths programs **£9.95**
- Maths with a Story 2 (Cassette) 4 further maths programs **£9.95**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£19.95**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£14.95**
- BONDING: Science (Disc) O Level Chemistry program. **£14.95**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£14.95**
- ELECTRONICS IN ACTION (Disc) O Level program **£14.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£6.95**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£17**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£20**
- Modem Master (Disc) **£11.25**
- ADVANCED TELETEXT SYSTEM **£6.90**
- PERIOD TABLE SOFTWARE **£20**
- USING YOUR COMPUTER (Cassette) 8-12 age **£24**

TED
The Teletext Editor Package for serious users

TED is the brand new package from Watford Electronics for the editing and creation of teletext (Mode 7) screens and displays. TED is ideal for anyone wanting to create their own Mode 7 pictures (such as game title pages), designing animated displays for shop windows, exhibitions, classrooms, etc. TED is also probably the most powerful Prestel screen editor you will ever come across.
Supplied on a special 32k package, full facilities are providing for manipulating the screen, including easy to use pixel manipulation; line, column and block buffering and copying; left and right margins; large text in a variety of different fonts (contained within the ROM device); various borders and effects templates (contained within the ROM device); line and column insertion and deletion; easy to use graphics line drawing. Those are some of the features of editor itself. In addition to this, TED contains routines for taking a number of Teletext screens and creating them into an animated sequence, with user selectable display times, repeats on a group of shows, various entry methods (how the picture is put onto the screen), routing selection (both predefined and keyboard specific), chaining of other shows, etc. Scrolls treat the Teletext sequence as a very long page with a window onto it. Supplied complete with a comprehensive manual. There are many more facilities not mentioned here, so write in for a comprehensive leaflet; you'll wonder how you managed without TED.

Price: £35

ROM-SPELL

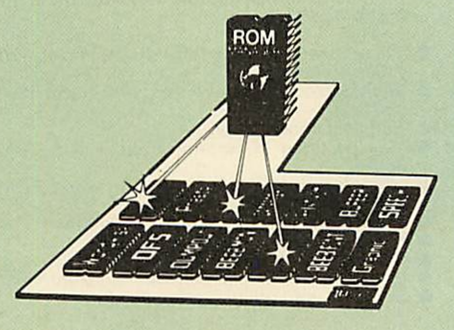


Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

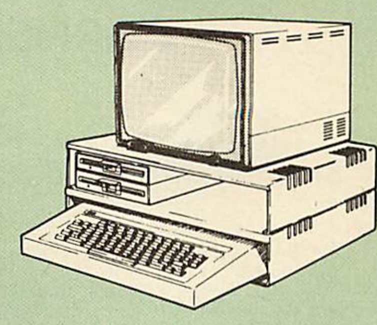
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

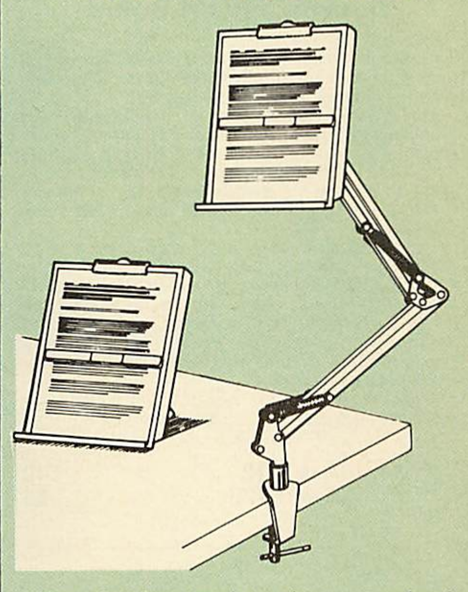
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£25** (carr £2.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip.

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

Continued




ARIES CORNER

The Aries B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:	Aries B-12	**£40**
	Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

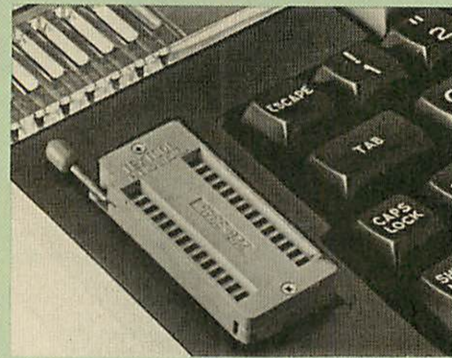
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

GRAPH PAD 2

Supplied complete with Software
£60 (Carr. £3)

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

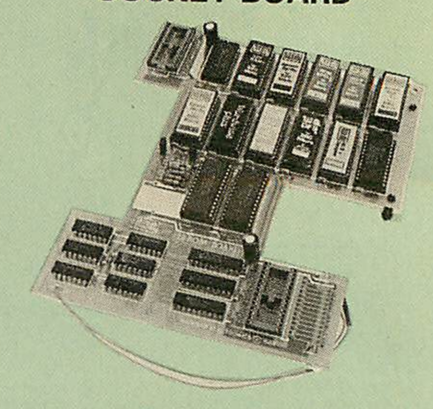
Only: **£24** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

All prices in this advert are exclusive of VAT.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

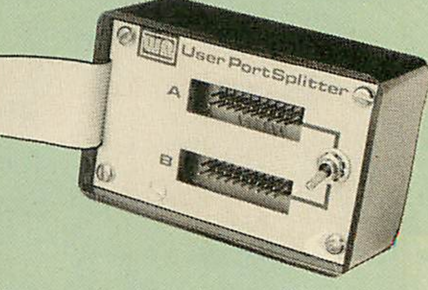
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

USER PORT SPLITTER UNIT

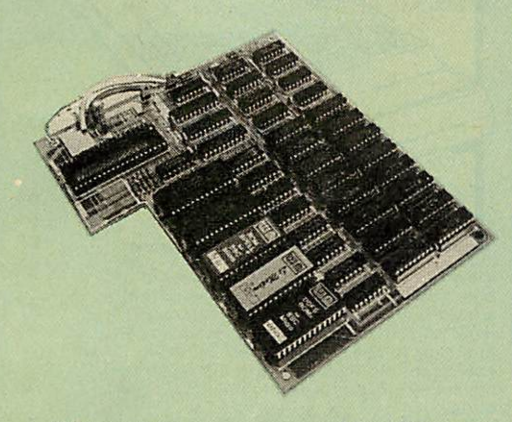


Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£15**

Watford ROM/RAM CARD

A must for all serious users



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM* ***£39***
- ROM/RAM card with 64k dynamic RAM ***£52***
- ROM/RAM card with a massive 128k dynamic RAM **£80**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit* *£6*
- *16k Dynamic RAM for Upgrade* ***£7.50***
- *Battery backup* *£3*
- *Read and Write protect switches* ...... ***£2 each***

Complete ROM-RAM board (all options installed) ***£89***

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

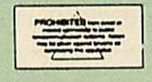
The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple "*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***
- *BT Approval applied for.*

(When ordering, please specify the version required, (BBC or Master)

SPECIAL OFFER

Price: **£74**
(carr £3)

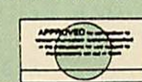


(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

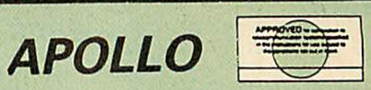
£82



(Price includes: Nightingale Modem, Commstar ROM pack & Comprehensive manual)

Nightingale Modem without software **Only £75**
COMMSTAR ROM package only **£29**
(P&P on modem £3.00)

APOLLO



The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£75** **(Carr £3)**
(Write in for full specification)

BT TELEPHONE CONNECTORS for Modems

LJU	1/4A Mini Line Master	£4.50
LJU	1/6A Mini Line Slave	£3.00
LJU	2/4A Line Master	£4.00
LJU	2/6A Line Slave	£2.50
LJU	3/4A Flush Master	£3.95
LJU	3/6A Flush Slave	£2.75
LJU	10/3A Dual Splitter	£5.50
	4 Way BT Plug	£0.75

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
DISC DOCTOR	£28
Graphics ROM	£23
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£24

Wordwise £24

Wordwise plus

WORDWISE PLUS £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £47

Inter SHEET ONLY £37



ONLY: £26

Inter-WORD

Only: **£39**

INTERBASE £59

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£37
VIEW 3.0 ROM	**£54**
VIEW PROFESSIONAL	**£85**
HI-VIEW (for use with 6502 2nd Processor)	**£36**
VIEW Printer Driver Generator Please specify Disc or Cassette)	**£9**
VIEWSHEET (Acornsoft)	**£37**
VIEWSTORE	**£37**
VIEWSPELL with 80 track disc	**£29**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£22**
VIEW-INDEX	**£12**
OVERVIEW Packs 1 & 2 for the Master	**£85**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

Micros in Business (Disc)

An introduction to Business software for the BBC Micro from Acorn **£43**

ADVANCE COMPUTER PRODUCTS' ROMs

Adv. Disc Toolkit	£29
Adv 1770 DFS for Mast/Compact	£29
Adv 1770 DFS for BBC/BBC+	£29
Adv Disc Investigator	£24
Adv. Control Panel	£29

MINI OFFICE II

Disc Version	£14.50
ROM Version	£48.00

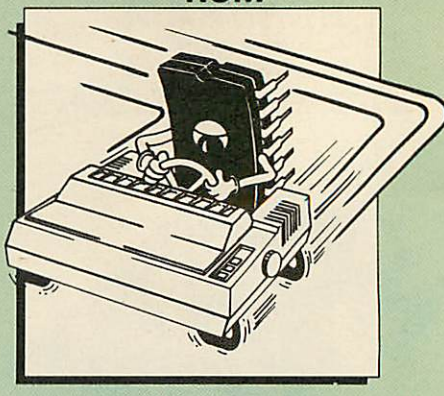
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Acorn's Speech Synthesiser package, complete Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

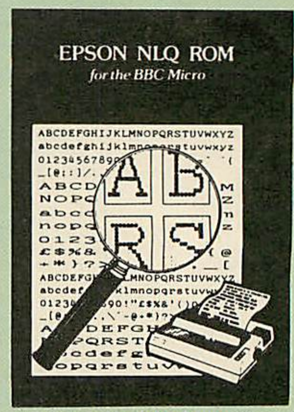
The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33



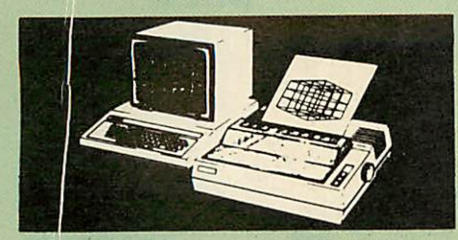
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- *Vertical and horizontal scaling in all graphics modes and mode 7*
- *Rotation of image by 90, 180 or 270 degrees*
- *Left hand margin setting*
- *Screen dump window setting*
- *Colours appear as grey scale*
- *Two tone fast dump*
- *Colour mask*
- *Mode 7 contrast expansion*
- *Mode 7 contiguous dump*
- *Key triggered and User Port triggered dumps*

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1080, Mannesman Tally and compatibles.

Only: £25

(Write in for further details on all above ROMS)

THE EUREKA CARD

(The Unique RAM Expansion System)

The Eureka Card is Watford's latest and most sophisticated RAM expansion system. Using advanced PAL based technology this card is a breakthrough in RAM systems for the BBC micro. The Eureka Card provides the user with around 58K of free memory in Basic, VIEW and WORDWISE PLUS. You also get Shadow RAM from within the active language. No other RAM expansion system can match that!

Load up to 58K long Basic programs. Texts in VIEW and WORDWISE PLUS up to 58K as well. This with absolutely NO loss of speed in accessing your text or program. Eureka consists of a card containing 64K of program memory, two parallel banks of sideways RAM and some extremely complex switching circuitry. This is all controlled by Eureka's highly sofisticated software supplied in ROM. Designed to a very high specification, this board is fully buffered to give reliable operation under virtually any circumstances.

The Eureka board plugs into the 6502 socket and has NO messy flying leads. It is compatible with many other products from Watford, such as our Solderless ROM Board and our ROM/RAM Board. All in all, the Eureka Card is an amazing board. Jump into the age of serious data processing with a Eureka Card! Please write in for further details 'on advantages the Eureka can offer you'.

Introductory price: Only **£89** (carr £3)

(P.S. Eureka is only suitable for a standard model B; it normally replaces any Shadow RAM cards present. Some speed degredation does occur with filing system access. Eureka cannot be used at the same time as a second processor).

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24.**

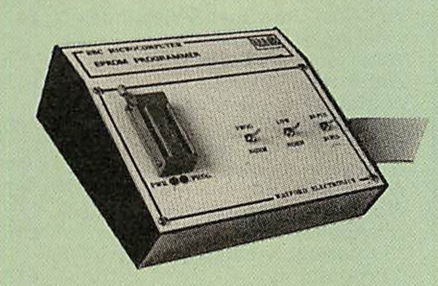
THE NLQ DESIGNER

(The First & still the Best)
Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.
Supplied with disc containing over 25 example fonts. Please specify 40 or 80 track. Fonts are: Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print and Gothic etc. (P.S. This ROM is not suitable for Epson printers.)

- *NLQ Designer ROM & FONT Disc* **£25**

ADDER



Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£3 Carr)

TEX EPROM ERASERS

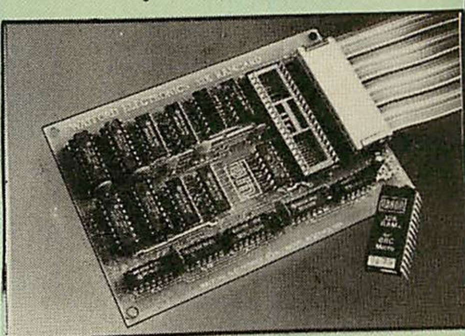
EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.
- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

See next page for SPECIAL OFFER

Only £59 (carr £2)
(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Continued


BOOKS (No VAT on Books)

30 Hour BASIC (BBC Micro)	£7.95
40 Best machine Code Routines	£7.95
50 Programs in BBC BASIC	£6.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Lang. Subroutines	£19.95
6502 Development Package	£7.50
6502 Reference Guide	£9.95
68000 Assembly Lang. Programming	£19.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£16.95
6809 Machine Code Programming	£7.95
8086/8088 Assembly Language Prog.	£11.95
8086/8088 Programming the	£16.95
Advanced Disc User Guide	£16.95
Advanced BASIC ROM User Guide	£9.95
Advanced Programming Guide to BBC	£9.95
Advanced Sideways RAM User Guide	£10
Advanced User Guide for BBC	£10.95
Advanced FORTH	£9.95
Advanced Graphics with BBC	£9.95
Assembly Language Programming on BBC Micro	£11.50
Adventure into BBC BASIC	£6.95
Applied Assembly Lang. for BBC	£9.95
Art of Microcomputer Graphics	£14.95
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Language Programming on the BBC & Electron	£8.95
Basic ROM User Guide	£11.95
BBC B Compendium	£5.95
BBC B+ User Guide	£14.95
BBC BASIC for Beginners	£7.95
BBC Forth	£7.50
BBC Hardware Projects	£8.95
BBC Micro & the small Business	£5.75
BBC Micro ROM Book	£10.95
BBC Master 128 for High Flyer	£10.95
BBC Micro Disc Companion	£8.95
BBC Software Projects	£6.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£7.95
C for Beginners	£10.95
C for Programmers	£9.95
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
CP-M-86 User's Guide	£19.95
CP-M Bible	£16.50
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
CP-M The software BUS	£8.95
Creative graphics on BBC Micro	£7.50
Disc Drive Projects for Micros	£5.45
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
DBASE Programming Language	£14.95
Disc Programming Techniques	£9.95
Exploring FORTH	£6.95
FORTH on the BBC Micro	£7.50
Functional Forth for the BBC Micro	£5.95
Guide to BBC ROMs	£9.95
Graphics for Children	£6.95
Graphs & Charts on BBC Micro	£7.50
Hackers Handbook - New	£6.95
Inside Information (Computers, Interfacing & Control o/t BBC Micro	£9.95
Communications & People)	£8.95
Interfacing & Robotics on BBC	£15.95
Introduction to COMAL	£9.50
Introduction to LOGO	£6.95
Introducing 'C'	£9.95
Introducing LOGO	£5.95
Introduction to FORTH	£8.95
Introduction to PASCAL	£17.95
ISO-PASCAL Reference Manual	£9.95
LISP 2nd Edition	£14.95
LISP, A Beginners Guide to	£10.95
LISP on the BBC Micro	£7.50
LISP the Language of Artificial Intelligence	£9.95
Logo on the BBC Micro	£7.50
Logo Programming	£9.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master Advance Reference Manual	£19.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Mastering View, Viewsheet & Mathematical Progress in BBC Basic	£7.95
Micro Prolog	£10.00
Microtext for the BBC	£10.00
Viewstore	£12.95
Points of View	£6.95
Practical Disc File Techniques	£5.95
Programming the 6502	£16.95
Programming the Z80	£19.95
Structured Basic	£7.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Toolbox 2	£10.95
Towers Int. Transistors Selectors	£12.95
Turtle Graphics on BBC Micro	£7.50
Understanding FORTH – A Beginner's Guide	£6.50
Understanding Interword – A Beginners Guide	£6.50
View 3.0 User Guide	£10
View Guide	£4.50
VIEW incl. ViewSpell & ViewIndex	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Within the BBC Micro	£13.95
Writing Interactive Interpreters & Compilers	£8.45
Wordprocessing BBC Beginners Guide	£7.95
Wordstar & CP/M made easy	£7.45
Wordwise + A User Guide	£9.95
Z80 Applications	£15.95
Z80 Assembly Language Programming	£19.95
Z80 Reference Guide	£9.95

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

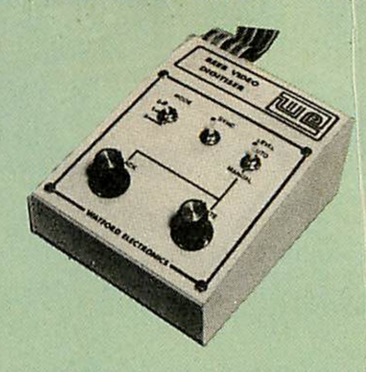
DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

BEEB VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the AMX Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within AMX Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£129.00** (carr. £3)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£12
Delta 3B Twin Joysticks	£17
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£12
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

£2

ACORN MUSIC 500

BBC B, B+ & Master compatible.

You too can acquire this music package that has already thrilled thousands, for:

ONLY **£29** *(carr £3)*
(included FREE with every unit, 'MU-500' software disc worth £6)

ATTACHE CARRYING CASE for BBC Micro

This attache carrying case is attractively finished in mottled antique brown leatherette. An ideal and safe way of carrying your BBC Micro around. Supplied with two Keys.
Price: **£13** (£2 carr.)

28pin ZIF SOCKET (Textool) **£6.95**

28pin DIL HEADER PLUG

SOLDER type	£1.50
IDC CRIMP type	£1.95

SPARES for BBC Micro

Keyboard	£46	Keystrip	£2
UHF Modulator	£4	Case	£20
Speaker Grill	£1	Speaker	£2
Power Supply	£59	Keyswitch	£1.50

Replacement FLEXIBLE 17 way Keyboard Connector £3

8 WAY DIP SWITCHES

With these DIP switches soldered to their keyboard, any BBC B or B+ owner can take full advantage of the fast disc drives that we supply by configuring his BBC for fast disc drive operation.
Excellent value for money at **£1.00**

CONNECTING LEADS

(All ready made and tested(

CASSETTE LEADS 7 pin DIN Plug	
to 5 pin DIN Plug + 1 Jack Plug	£2.00
to 3 pin DIN Plug + 1 Jack Plug	£2.00
to 7 pin DIN Plug	£2.50
to 3 Jack Plugs	£2.00
6 pin DIN to 6 pin DIN Plug (RGB)	**£2.50**

DISC DRIVE POWER LEADS
Supply from BBC power supply to standard Disc Drive connector.
Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS
BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

MISCELLANEOUS CONNECTORS

	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles (15 pin 'D')	80p	200p
BBC Power Plug 6 way	80p	–
Disc Drive Plug 4 way	75p	–
6 way Power Connector	–	95p

Watford Dealers' List

UNITED KINGDOM

Badger Micros (Devon), Badger's Hill, Southerton, Ottery-St. Mary, Devon EX11 1SE. Tel: 0395 68516.

Beebug Retail, Dolphin Place, Holywell Hill, St. Albans.

Cambridge Computer Store, 4 Emmanuel St., Cambridge CB1 1NE. Tel: 0223 358264.

Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts.

C.J.E. Micros, 78 Brighton Road, Worthing, West Sussex. Tel: 0903 213361.

Farnell Electronics, Canal Road, LEEDS LS12 2TU.
Tel. 0532 636311.

HCCS, 575-583 Durham Road, Low Fell, Gateshead, Nr. Newcastle Upon Tyne. Tel. 091 4870760.

Mancomp Ltd, Printworks Lane, Levenshulme, Manchester. Tel: 061-224 1888-9888.

Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford, St. Helens

Verospeed Ltd, Boyatt Wood, Eastleigh, Hants.

OVERSEAS DEALERS

*Absolute Electronics, Rewal House, 208-210 La Trobe Street, Melbourne, 3000, Victoria, Australia. Tel: (03) 663 2411.

Alpha Computer Co, Shop 314 Chi Fu Commercial Centre, Chi Fu Fa Yuen, Hong Kong, Tel: 5-506592.

Computer Distribution Company, Parklaan, 47, B09300 Aalst, Belgium.

E.B.N., Elisenstrasse 13, 1000 Berlin 41. Tel: (030) 7952057

Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearce Street, Dublin 12. Tel: 710796.

Scientex P.V.B.S., Zilversmidstraat 2, B-2000 Antwerpen, Belgium. Tel: 03 233 59 06

Techno-matic Data, Holbergsgade 19, 1057 Kobenhavn K, Denmark

*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland, Tel: (010) 413 8197/414 5171.

Viking Tecno, Vestergade 12.1, 9620 Aalestrup, Denmark, Tel: 08 642522

*Acorn/Watford Referral Centres.

Viglen Console Unit

Enhance the appearance and convenience of your BBC Micro & Master with the Viglen console unit.

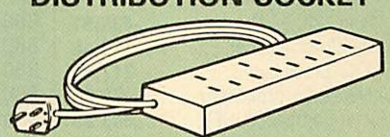
BBC **£42**; Master **£51** (carr. £4)

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£6.99**

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals..

£8.95 (carr £1.50)

The above unit is also available with a built-in surge Arrester, providing Protection for your complete system.
Spikes Cleaner Unit: £12.50 (carr £1.50)

CHIP SHOP

8271	£36.00
DS3691	£3.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£4.40
2764-250nS	£3.50
27128-250nS	£3.75
27256	£4.20
27512	£9.50
27C101G (1 Meg)	£20.00
4013	60p
4020	£0.90
4464	£3.75
4816 RAM	£1.75
41256	£2.25
6264LP-8K RAM	£2.80
6502A CPU	£4.75
65C02 3M	£9.75
65C12	£9.00
6512A	£10.00
6522	£3.40
6522A	£5.00
6845SP	£6.00
68B50	£2.95
7438	40p
74LS00	25p
74LS04	25p
74LS10	25p
74LS123	80p
74LS163	70p
74LS244	80p
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	70p
Acornsoft C	£78

ASSORTED ROMS

ACORN ADFS	£25
ACORN BASIC 2	£19
Acorn BCPL	£42
Acorn COMAL	£38
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C	£78
Acorn LISP	£35
Acorn LOGO	£49
Acorn OS B+	£25
Acorn OS 1.2	£14
Basic Editor	£24
Beebfont	£25
Beebmon	£22
BROM Plus	£32
Buffer & Backup	£20
Communicator	£49
Disassembler	£16
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
Help II	£27
ISO Pascal	£54
ISO-Pascal Stand Alone Generator	£30
ICON Master	£28
Logotron LOGO	£45
Master Termulator	£34
Micro Prolog	£62
Microtext Disc	£48
Mini Office ROM	£47
MUROM	£21
ROMAS	£29
ROMIT	£29
Serial ULA	£13
STUDIO 8 Disc	£18
TERMULATOR	£28
Toolkit Plus	£31
View Professional	£85
Video ULA	£15
ULTRACALC	£26

Prices subject to change without notice and available on request. ALL OFFERS subject to availibility.
Mail Order and RETAIL SHOP. Trade and Export inquiries welcome.
Government and Educational Establishments' OFFICIAL ORDERS Accepted.
Shop Hours: 9.00am to 6.00pm. Monday to Saturday. Thursdays 9am to 8pm. (Free Customer's Car Park)

VAT: UK customers please add 15% VAT to cost incl: Carriage.
CARRIAGE: Unless stated otherwise, minimum £1 on all orders. £2 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost.
Specifications of all products are given in good faith but is subject to change without notice. Some items vary in their availability. Please ring for latest delivery situation.

Watford Electronics

JESSA HOUSE, 250, Lower High Street, WATFORD, ENGLAND
Telephone: (0923) 37774; Telex: 8956095; FAX: 01 950 8989

ORDER VIA MicroLink 72:MAG030

Electronequip

Computers & Accessories:

Master 128	435.91
Turbo Co-processor	119.46
512 Co-processor	217.41
Universal Co-processor	79.95
Master Compact (UHF)	343.85
Master Compact (Col)	534.23
Compact Companion	39.95
Master ROM Cartridges	14.95

Monitors:

Colour:

Philips 8833 Med Res BBC/IBM compatible	287.50
Microvitec 1451 Med Res BBC RGB TTL	249.95
Mono: Zenith ZVM1230 (Green) and ZVM1220 (Amber)	79.95

Disc Drives:

(Two year warranty)

MD400A (No PSU)	132.96
MD400B (With PSU)	149.95
MD802C (No PSU)	259.90
MD802E (With PSU)	289.95
MD802D/M (in Plynth)	309.95
MDCOMBO (5.25&3.5)	259.00
MD20M 20Mbyte Wini	659.96

Printers:

Dot Matrix:

Citizen 120D (80col)	189.00
Star NL10 (80col)	209.95
Star NX15 (132col)	389.00
Epson FX800 (80col)	399.00
Epson FX1000 (132col)	549.00
Star NB24-10 (24pin)	599.00
Epson LQ800 (24pin)	599.00

Daisywheel:

Juki 6100 (18cps)	343.56
Gakken GPR2000 (18cps)	199.95

BBC & Master Spares:

BBC Power Supply	56.35
BBC Keyboard	49.95
BBC O.S. 12	12.58
BBC Basic II	19.95
BBC Cases (complete)	17.95
Master Power Supply	59.95
Master Keyboard	54.95
Master Batteries	4.95
Acorn 8271 Disc/I/F	69.00
Acorn 1770 Disc I/F	49.95

Electronequip:
New for **Master & Compact** View Printer Driver generator and menu 12.95/13.95

Dust Covers:

We stock dust covers for most popular items. Here's a selection:

Master 128	4.49
Star NL10	5.41
Citizen 120D	5.50
Microvitec	6.46

ROM Software:

A selection from our large range:

Acornsoft

View	44.95
Viewsheet	44.95
Viewstore	44.95
Overview	89.95

AMX

Mouse Super Art	79.95
Pagemaker	45.94
Max (Desktop)	18.95

Computer Concepts

Inter-word	49.00
Inter-chart	32.00
Inter-sheet	49.00
Wordwise Plus	49.00
Inter-base	60.00

Discs:

Box 96Tpi D.S. in plastic Library Case (5.25")	12.95
Box 30 96Tpi D.S. in Plastic Storage Box (5.25")	39.90
Box 10 135Tpi D.S. (3.5")	24.95
Box 10 96Tpi D.S. Unlabeled discs	6.90
Large Selection of Disc Storage Boxes	**£6.90 to 19.90**

A.T.P.L. Sidewise ROM Board. The most popular and original Special Offer 39.33

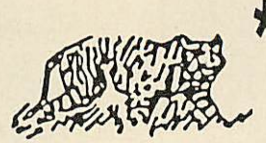
Merlin

Datascribe	59.95
Titan	89.00

Prices subject to variation without prior notification. Trade, Government and Education orders Welcome. **Barclaycard** & **Access,** orders accepted. All prices **include** 15% V.A.T. P&P Please add **92 pence.** Securicor **£6.90** per parcel.
Please send for our extensive Mail Order catalogue.
59 West Street Fareham Hants PO16 0AT
Tel: 0329-230670/1







* SUMMER * SALE!

SPECIAL OFFERS

All prices include V.A.T.

BBC Master 128 computer £398.00
New Acorn Arkimedes
Limited Stocks please telephone

BBC Master 128
plus
Citizen 120D printer
only £560.00
including free 24hr delivery

New Amstrad PC 1640 computer
10% discount
Amazing printer bargain
Amstrad Dmp 3000 £157.55
Panasonic JXP1081 £165.90
Citizen 120D £172.50
Citizen MSP1OE £228.85
Citizen MSP15E £270.25
All citizen printers have a two year warranty
BBC parallel printer cable £8.25

STAR NL10
plus
Parallel interface only £208.00!!

GPR 2000 18 cps daisywheel printer
only £199.00
Nightingale modem/commstar package
offer only £97.00
Computer concepts interwood ROM only
£48.00 (free delivery)
Micro-vitec 1451 col monitor with
cable only £258.00

TIGER SOFTWARE
66 ST MICHAELS LANE,
BRIDPORT, DORSET DT6 3RB
TEL: 0308 27691

Please add £8.00 for next day delivery by door to door courier

GOING GREEK

If the Greeks have word for it, then you can be sure that Joe Telford has a program for it

Joe Telford



ILLUSTRATION BY DOLORES FAIRMAN

This month my thoughts turn to sun, sea, sand and foreign parts. What can you do if you arrive in an out of the way Greek island where English is not commonly spoken? Let your BBC micro help you get by with a crash course in Greek, because I have devised a couple of programs to help you learn the language.

I've been having a recurring nightmare, brought on by her ladyship spending our hard earned sponduliks on a summer holiday in far off Greece. The island of Kefalonia to be precise. Okay, so it's going to be warm, relaxed, rustic and full of friendly people, but Katelios, our out-of-the-way retreat is going to be hard work for my CSE Greek (failed).

We went there last year. No heavy discos, cultured waiters or timeshare operators, just heavy backgammon sessions

with the local fishermen, down at the taverna at the end of the beach known throughout Kefalonia as Jimmy's Place. I normally begin my 'phrase-book period' straight after Spring Bank holiday, and this continues right up to mid-August when we leave. By this time I've picked up such useful phrases as 'ee gata moo pothee ena neo boozee' (my cat needs a new spark plug), and I feel ready to trade all my irregular verbs with the locals.

This year I thought I would use the BBC micro to improve their chances with the 'trelos anthros apo Ayylika' (crazy man from England). I decided that I would limit the language exploration to two areas:

- The Greek numbers.
- The Greek menu.

To do this I considered my resources:

- A few Greek friends.
- A fistful of phrase-books
- A couple of audio-tapes.

It was apparent that all would need pressing into service, and even then, my non-fluency in modern Greek would ensure that there would be some linguistic goof-ups. For this, I humbly apologise to any readers with a Greek background. However, nothing ventured, nothing gained, so I set about designing the first program, to help with numbers.

Now I hit my first hurdle. How do you represent the Greek word for a number, say 10, in a useful format on the computer? I tried the following logic: When I say 10 in Greek the word sounds 'theka', so I'll have the computer print 'theka', to which I will key in '10'. This was shot down immediately, because good educational practice in learning a language means that we need to see the exact Greek word in Greek letters. Two spin-offs are:

- We would combine learning the letters with the numbers
- We would get a working knowledge of word patterns as a preparation for reading general Greek words.

To progress, we need a method of displaying the Greek alphabet on screen, and of associating that alphabet with the computer's English characters. Look at figure 1, the Greek alphabet. The first column contains the Greek capital letters, and the second contains the lower-case letters. The third column is the sound that the letters make when pronounced, and the last column is my attempt to relate them to the English alphabet.

The first column contains no real problems (apart from the unusual shapes), but the second column has the lower-case *sigma*, or 's' sound, which has two versions. One of these is found inside words and the others, the elongated 's' is sounded only at the end of words. The other slight problem is that the Greek alphabet contains only 24 letters, which gives us two spares. I decided first to define the ASCII characters from 192 to represent a Greek character set. These characters can't be typed directly from the keyboard. I felt there was a need to access the characters quickly, by referring to keyboard letters. For example the Greek word for 10 should be typed in as 'deka' and then each letter would be mapped to the Greek character set and be printed correctly.

The fastest approach is to relate each keyboard character directly to a Greek letter, by adding 128 to the ASCII code of the keyboard; 'A' is code 65 and that makes capital *alfa* become code 193. This meant deciding which Greek letters were most suited to direct encoding as English letters. After some thought I decided to use an intuitive method where the letters would be related mainly by sound. Figure 2 shows how that worked out. The keyboard simply indicates which English letter matches its respective Greek letter. Generally speaking the assignment works well, and a good many Greek words can be typed in almost letter for letter.

Now look again at figure 1. Notice there are a number of problems.

- The English letters 'Y' and 'G' are both used to represent *gama*. This is simply because *gama* can sound as a 'G' or as a 'Y'

Symbols		Name	Keyboard equiv.s
Α	α	Alfa	A
Β	β	vita	B
Γ	γ	gama	G Y
Δ	δ	thelta	D
Ε	ε	epsilon	E
Ζ	ζ	zita	Z
Η	η	ita	J
Θ	θ	thita	C
Ι	ι	yota	I
Κ	κ	kapa	K
Λ	λ	lamtha	L
Μ	μ	mi	M
Ν	ν	ni	N
Ξ	ξ	xi	X
Ο	ο	omikron	O
Π	π	pi	P
Ρ	ρ	ro	R
Σ	σ ς	sigma *	S @
Τ	τ	taf	T
Υ	υ	ipsilon	U V
Φ	φ	fi	F
Χ	χ	khi	H
Ψ	ψ	psi	Q
Ω	ω	omega	W

Figure 1. Greek letters and English equivalents

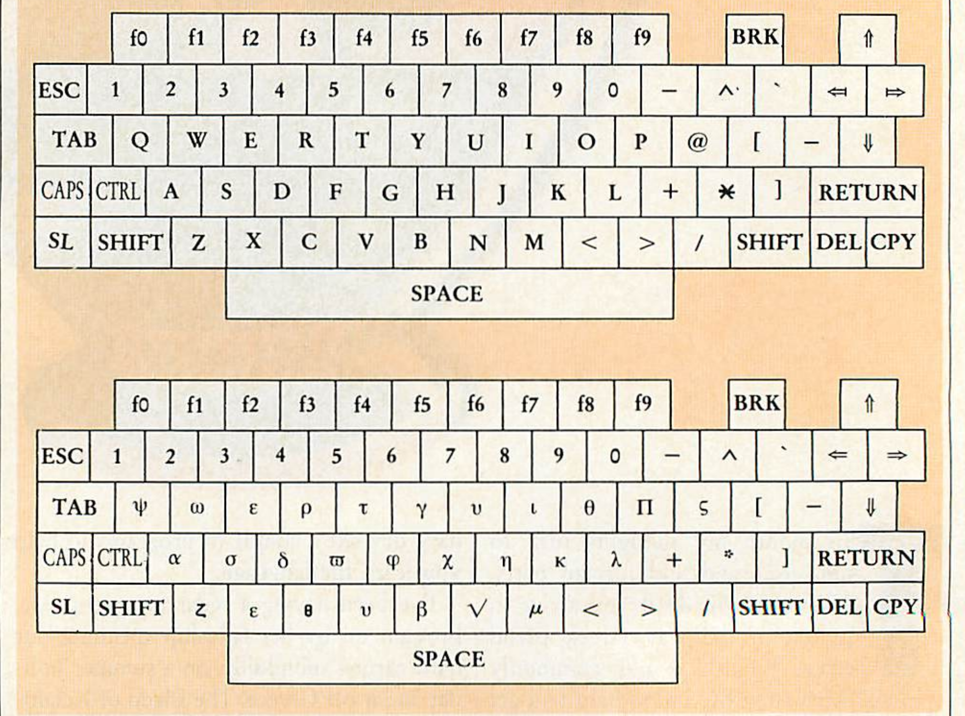


Figure 2. How English and Greek letters correspond on the keyboard

depending on its position in relation to other letters in a word.

- The 'S' character is normally used for *sigma*, but for *sigma* at the end of words, I decided to use the @ sign because it reminded me of the extended 's'.
- The *epsilon* character was allocated to 'U' and to 'V' because of my own confusion over the shape of Epsilon. I generally use 'U', but 'V' occasionally creeps in.
- The *khi* sound fits best with 'H' leaving the *xi* sound for 'X'.
- The *psi* letter was allocated to 'Q' because it was free, and also because 'Q' is just before 'P'.
- The *thita* sound was allocated to 'C', another free key, and remembered by a lisped 'th' being a soft 'C'.
- The *vita* character looks so firmly like a 'B' that I left it there!

Character set

The next stage was to define the new Greek character set. If you have a Master much of the work is done for you because it contains an almost complete Greek character set. The alternative approach is shown in figure 3. Here we define character 64 (@) to be the end of word *sigma*. This has to be done for each of the letters, both upper and lower case. To help out, listing 1 on the yellow pages contains a character set called HIGREEK. On a Master it can be installed by just typing:

```
CH."HIGREEK"
```

On a normal BBC micro or B+, first type in:

```
*FX 20,2
PAGE=PAGE+&200
```

Once installed, the program is not required (unless you hit Break) and hence can be deleted with NEW. Further programs can be loaded to make use of the character set. To do this we need a short function – FNgreek(M$) – which uses one parameter, the string in 'keyboard Greek' to be translated. The function therefore looks like this:

```
DEF FNgreek(m$)
LOCAL loop%,g$,a$
g$=""
FOR loop%=1 TO LEN m$
a$=MID$(m$,loop%,1)
IF a$>"@" THEN a$=CHR
$(ASC(a$)+128)
g$=g$+a$
NEXT
=g$
```

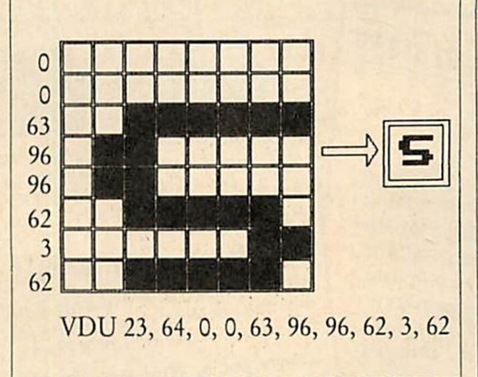


Figure 3. Making the Greek *sigma* character

Notice that FNgreek returns the translated string so we can use a calling line like:

```
PRINT FNgreek("dwdeka")
```

or alternatively:

```
g$=FNgreek("trianda")
```

The next stage of looking at the Greek numbers was to work out how the numbers went together. Figure 4 shows the alternatives I eventually came up with. Greek numbers fit together very comfortably, there being no 'ands' to break up the flow. For example 6258 is translated as 'Exi hiliades, diakosia peninta okto'. This meant that a minimum of data statements would be required. I would have to put keyboard translations for:

- Units: one to 12 (12 numbers before repetition)
- Tens: 10 to 90 (nine numbers)
- Hundreds: 100 to 900 (nine numbers)
- Thousands: 1000 to 1200 (12 numbers)

Listing 2 is the Greek numbers program. Type it in and call it 'numbers'. It contains the HIGREEK VDU codes, and if space is tight, these could be deleted. If you delete the VDU codes, then a loader program must be created as follows:

- First make a copy of HIGREEK called NLOADER
- A last line of NLOADER should be added and should therefore read as follows: CHAIN "NUMBERS"
- Build a ! BOOT file containing:
  0001 *FX20,2
  0002 PAGE = PAGE + &200
  0003 CH. "NLOADER"
- Type *OPT4,3

Once listing 2 is running, you should see a screen like figure 4. Move the cursor keys to highlight the option you wish to explore and press Return. The program will present you with 10 questions and score you as you progress. Most of the working screen is in

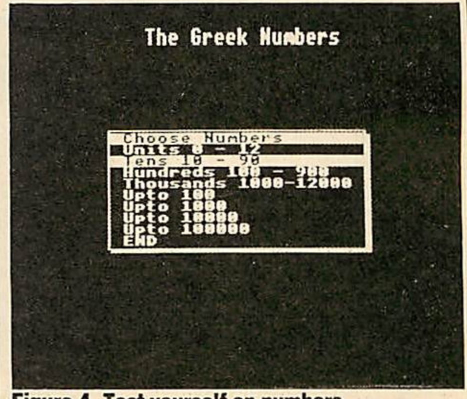


Figure 4. Test yourself on numbers

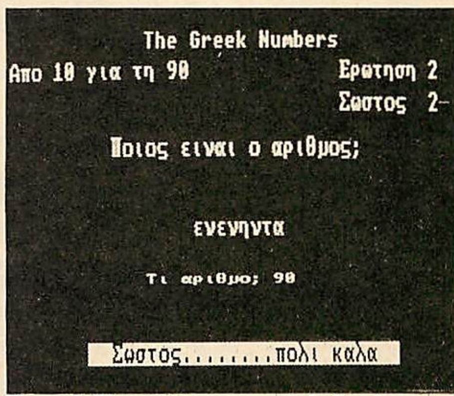


Figure 5. The working screen is in Greek

Greek and is shown in figure 5. The translations are shown below:

Ερϖτηση	Question (no.)
Σϖστοζ	Right (so far)
Ποηοζ ειναι ο αρ ιθμοζ	Which number is it?
Τι αριθμο	What number?
Σϖστοζ. . .πο λΙ καλα	Correct! Very good!

It does take a little time to pick up the letter and word forms, but it pays dividends in terms of general familiarisation with Greek vocabulary. If you can afford the time, try to say each word out loud, so that you associate sound with the numbers too. If you have *Speech!* from Superior Software or Computer Concepts' *Speech* ROM, then try:

*SAY trianta okto

The second item that is worth learning about is the Greek menu, for a taverna or εστιατορ ιον (restaurant). Rather than replicate the learning techniques employed in the numbers program, we could learn about taverna food from the other side.

Imagine that you are the owner of a Greek restaurant, and you have to produce a daily menu (καταλογο) in both Greek and English. The BBC micro can help you, provided you have your trusty phrase-book to hand. Type in listing 3 from the yellow pages, save it as 'MENURDR', then run it

No.1, Leader of the pack!!!

Choice of 5 packs

Artroom

SAVE UP TO £12.90

£30 5¼ inch Disc (ADFS ONLY) **£34** 3½ inch Disc

With Digimouse add **£35**

The ARTROOM pack consists of ARTROOM and ACE (Artroom Colour Extension). ARTROOM is an icon based full screen graphics package which can be controlled by mouse or keyboard. All the usual features are there including 'cut and paste' and our highly acclaimed ZOOM option plus an extensive graphics library to help you produce pictures quickly. An advanced printer dump is also supplied.



'ARTROOM...the best there is.'—Acorn User Feb '87

'ARTROOM is the software for you.' A & B Jan '87

ACE consists of two programs. COLOURIZER enables you to produce MODE 1 colour versions of ARTROOM screens and to dump them to a printer using a shaded printer dump. The MODE CONVERTER program will convert any graphics screen into a 4 ARTROOM screen ready for loading into ARTROOM. Conversions can be made from Modes 0,1,2,5 and 7, yes SEVEN!

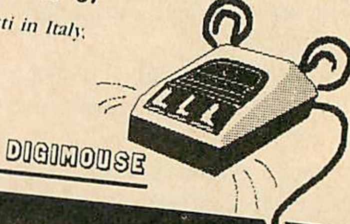
'...very pleased with the way Clares have introduced the colour facility.' A & B June '87.

ARTROOM and ACE will work with any mouse but we recommend DIGIMOUSE because it is well engineered using a non-slip ball and optical encoders. DIGIMOUSE also includes the unique 'LINEAR LOCK' facility that enables you to draw straight lines freehand.

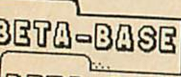
'...impressed by Nidd Valley Digimouse' A & B June '87

This complete package is marketed by Olivetti in Italy, the home of style and design.

ACE A STROKE OF GENIUS!



BETA-BASE



SAVE £7

£30 5.25 inch Disc £34 3.5 inch Disc

The Beta-Base pack consists of Beta-Base, the number one database for the BBC micro, and Beta-Base Utilities which extends the power of Beta-Base.

The main feature of Beta-Base is its ease of use which is achieved without sacrificing the power and flexibility required for the efficient manipulation of up to 65,000 records.

The Beta-Base Utilities provide seven new utilities. There are more powerful versions of Search and Sort and there is also a Mail Merge program which creates perfectly formatted letters containing data from your files.

'We use Beta-Base ourselves' Mike Bibby, Editor of MICRO USER.

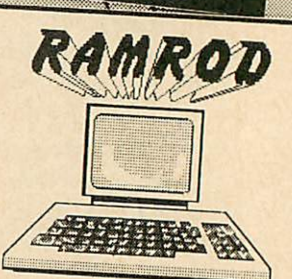
'Rated best value for money'—ACORN USER Dec '84

When ordering please state the following:
Machine
Disc size (5.25, 3.5)
Disc format (40 or 80)
DFS version

N.B. If ordering for a Master or Compact please state DFS or ADFS. The ARTROOM pack is for the Master or Compact only but all other software is available for all machines.



RAMROD



UTILITIES PACK
SAVE UP TO £30

£50 5¼ inch disc £60 ROM £54 3½ inch disc

The UTILITIES PACK consists of RAMROD and MACROM. RAMROD is the ultimate toolkit ROM and it is compatible with the whole BBC range and includes a disassembler plus editors for DFS, ADFS, RFS, memory, Shadow memory, Sideways RAM, Tube plus lots more. RAMROD will take you to the furthest reaches of your machine and enable you to boldly go where no ROM has gone before!

'an ingenious collection of utilities...' BEEBUG Oct '86
'worth its weight in gold.' A & B Jan '87

MACROM is a fast full featured MACRO ASSEMBLER that allows the use of macros, which are loaded from disc. MACROM has its own easy to use editor which automatically formats your source code. A HI version of MACROM is supplied for use with the second processor. A macro library and demonstrations are also supplied.

'Full marks for an excellent product.'—BEEBUG JUNE 1986

We are also making BROM+ available under this offer. Its main feature is the full scrolling BASIC editor which allows the user to edit a program as if dealing with text in a wordprocessor. There are many other features dedicated to making life easier for BASIC programmers.

'This is the best BASIC screen editor I have so far used.' —MICRO USER August 85

For BROM+ add £25 on ROM, £20 for 5.25 inch disc or £22 for 3.5 inch disc.

Fontwise + Pack

SAVE £10

£30 5¼ inch Disc **£34 3½ inch Disc**

The FONTWISE+ pack contains FONTWISE+, the FONT EDITOR and 22 fonts. FONTWISE+ enables you to print very high quality text in a choice of 22 different fonts and 3 sizes. You do not need a special printer, just an EPSON RX or FX compatible. High quality is not the end of the story because you can also have both proportional and justified text. The output has to be seen to be believed.

FONTWISE+ is compatible with WORDWISE, VIEW, INTERWORD, MINI OFFICE II and EDWORD II.

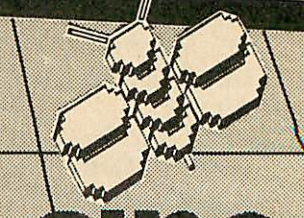
'FONTWISE is better than many NLQ packages'—ACORN USER Sept '86

The FONT EDITOR is very easy to use and allows you to edit the current fonts or create new ones. Reviewers have praised the editor for its ease of use and faultless presentation.

'editor is impressively quick, smooth and easy to use'—A & B
EDITOR '...puts all previous designers to shame.'—BEEBUG July '86

Ask for a sample printout.

Suppliers of top quality software for the range of Acorn Computers



Clares

98 Middlewich Rd Northwich Cheshire CW9 7DA Tel: 0606 48511



DON'T FORGET, YOU CAN ORDER WITH ACCESS CARD TOO!

and follow the instructions.

The first thing you'll be asked for is the restaurant name. Type this in 'keyboard Greek' (KG). Next the name of the first course is required: type this in keyboard Greek too. A typical example is the word OPEKTIKA. The next item is the English equivalent, so type this in standard English. For OPEKTIKA you might type Appetisers. Now you are asked how many items are on offer in this course. Type the number (to start with keep this one low, say two or three). For each item you'll be asked for a Greek name and an English translation. You are now asked if there is another course. If you type 'Y' (Don't press Return) the whole process repeats. If 'N' is typed the menu is displayed on screen. A flashing prompt in the top-left corner of the screen draws your attention to the fact that the sheet can be printed out. Type Y to print and N to move on. The same thing happens with each sheet, but the computer does two dumps per page of paper. This means that after every two dumps, or one page of paper, you may need to reset the paper position in your printer. A typical page from one καταλογο is shown in figure 6.

One of the problems with the MENURDR program is that there is no chance to edit or save your menus. For the best effect, we should be able to save text and alter it. Well, the good news is that anyone with an ASCII format wordprocessor can do just this. *Wordwise*, *View* or the Master 128 *Editor* should all be OK, and a typical menu is shown in Greek and English in figure 7.

Notice how alternate lines have keyboard Greek then English. It is important that each course name after the first one is prefixed with a 'Y'. This is to force a new course to be created in the MENURDR program. Note too that the very last item of the file must be an N to force the MENURDR program to begin screen dumping. The numbers which crop up throughout are the number of items in each course. They must be followed by that number of lines of Greek plus the same number of lines of English translation. The first two lines begin LOAD "MENURDR" then RUN.

Once the file is complete it can be saved or spooled from your wordprocessor as MENU. To get the finished menu copy, simply type:

*EXEC MENU

and it will issue commands to load and run MENURDR, then enter its own data into the program. You will still need to confirm screen dumping by hand.

Ταβερνα Τελφορτ - Καταλογο

OPEKTIKA.....(appetisers)

Τζατζηκι	Garlic & cucumber Yogurt dip
Ταραμασαλατα	Fish roe dip
Χταποδακι	Octopus
Σπανακοπιτα	Spinach squares
Κολοκυθακια	Courgettes

ΣΟΥΠΕΣ.....(Soups)

Αυγολεμονο	Lemon and egg soup
Χορτοσουπα	Vegetable soup

Figure 6. An example of a Greek menu with English translations produced with Joe's listings

I thought it would be nice to type entirely in Greek, without this FNgreek conversion! You will need a wordprocessor which operates in a screen mode other than mode 7, because mode 7 doesn't allow user-defined characters. To get the Greek characters simply CHAIN "GREEK", my name for listing 4, then NEW it. The keyboard will be redefined as in figure 2, and when you enter the wordprocessor, everything you type will be in Greek! But you'll need a screen dump program to print out the words. When you are ready to return to English, save your work, then type *BASIC followed by *FX20,0.

By the time this copy is hitting the news stands, I expect to be sitting back in Jimmy's Taverna, drinking 'εναΟυζο και νερο' and handling my drachmas like a native. Talking of drinking, I really have had a good deal of assistance with this article. I'd like to thank all the people who have helped out: George Kyriakos, Andrew and Joanna Odysseus and, of course, Jimmy Stathatos, himself.

'Στεεν εεγαχ οασ — εφκχαρεεστο'

Bibliography: The Greek Travelmate, *Richard Drew Publishing, £1.50.* Berlitz Greek for Travellers *available from most bookstores, £2.25.* A Textbook of Modern Greek, *The Greek Institute, London N21 2DS, approx £8.* Get by in Greek, *BBC Publications, £2.25.*

Turn to the yellow pages index on page 105 for details of Joe's listings.

```
LOAD "MENUREADER"
(MENURDR) for DFS.
RUN
Taberna Telfort – Katalogo
OREKTIKA
(appetisers)
5
Tzatzjki
Garlic & cucumber Yogurt dip
Taramasalata
Fish roe dip
Htapodaki
Octopus
Spanakopita
Spinach squares
YENTRADES
(Main Dishes)
5
Mousaka
Eggplant and meat in layers
Pastitsio
Macaroni and meat in a cream sauce
Tomate@ yemiste@
Stuffed tomatoes
Kotopoulo qjto
Roast Chicken
Soublaki
Skewered veal or pork
YGLYKA
(Sweets)
4
Galaktompoureko
Vanilla slice
Kataifi
Shredded pastry with nuts and honey
Mpakalaba@
Pastry filled with Nuts and syrup
Loukoumade@
Honey & Fritters
N
```

Figure 7. Sample courses from the menu

VOLTMACE

COMPATIBLE

● DELTA 3B TWIN

● DELTA 14B

Compact
COMPATIBLE

● DELTA 3S or 3SO

● DATAPRINT 2P

● DATAPAD 16B

Special offer on British made 100% tested and verified Parrot discs, in red, white and blue jackets. 10 of these highest quality DS/QD 96 TPI discs in assorted colours in a hinged plastic library case for just £19.95 including VAT and P&P.
Cheap excellent quality unbranded discs complete with labels etc all 96 TPI DS/DD just £9.50 inclusive for a box of 10.

FOR A BBC A, B, B + & MASTER
DELTA 3B TWIN – £19.95
2 joysticks wired to one plug.
As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

DELTA 3B SINGLE £12.95
A single joystick that in some ways can act as two. The custom made potentiometers are wired so that it will work as a left hand or right hand joystick. It can run some programs written for two joysticks and has two independant fire functions.

DELTA 14B £14.95
Our original ACORN/BBC handset. The same super light joystick, but with 14 long life buttons, video game tested for many years. A DELTA14B/1 is needed to run the keypad but a 14B on it's own will work as a joystick and fire buttons, so you can always add the 14B/1 to it later.

DELTA14B/1 for use with 1 or 2 DELTA 14B's £14.85
DELTA DRIVER CASSETTE £5.95
The A/D/USER PORT interface box. This gives simultaneous access to both the analogue port, for the joystick part and the user port, for the keypad. Two handsets can be plugged into the box giving a total of 24 user definable keys.
N.B. On a Master a small extension lead is needed to clear the RGB socket (£5.95 extra).
Full instructions are provided to include the keypad in your own programs even in BASIC or for the non-programmer a DELTA DRIVER cassette is available with keyboard to joystick/keypad conversions and keypad set up programs.

FOR THE MASTER COMPACT OR ELECTRON FITTED WITH A SWITCHED JOYSTICK INTERFACE
DELTA 3S £12.95
For an ELECTRON with a switched joystick interface (not a PLUS 1) this gives you the same delightful light, fast action of the DELTA joysticks but fitted with a 9 way D plug as per Atari. Commodore. etc. and will run on First Byte interface or similar.

DELTA 3SO – OPTICAL FEED BACK £19.95
Now you can see exactly when each switch has operated so you can move about faster and more certainly guaranteeing diagonals.

FIRST BYTE INTERFACE £19.95
Probably the most used ELECTRON interface – comes complete with software to run the majority of games on the ELECTRON using a DELTA 3S or DELTA 350 joystick.

SPECIAL OFFER buy a DELTA 3s and a FIRST BYTE INTERFACE together and **SAVE £2.89 ONLY £29.95.**

NEW !!! DATAPRINT 2P LOW COST – LOW PROFILE – PRINTER SHARER £34.95
A neat small unit which allows two parallel printers to be connected to one computer and simply switched between the two. e.g. one printer for paper and one for labels.

DATAPRINT 2C LOW COST – LOW PROFILE COMPUTER SHARER £34.95
The opposite of the DATAPRINT 2P this little box just 125 x 90 x 20mm allows two computers to share one printer.

DATAPAD 16B £39.95
A commercial spec. 16 way keypad. Full travel mechanical keys with double shot moulded keycaps mounted in a low profile metal case. The keys are marked with calculator legend, but the software included allows the pad to be defined as any keys, including function keys or single byte VDU commands such as PRINTER ON/OFF. No tampering the computer as it fits onto the user port.



Available from your dealer or direct from us on (0462) 894410



Unit 9, Bondor Business Centre, London Road, Baldock, Herts. SG7 6NG. Telephone (0462) 894410

ARC DE TRIOMPHE

The *AU* reviewers wasted no time in tearing off the packaging and giving the Archimedes the once-over

Bruce Smith & Graham Bell

Acorn's revolutionary 32-bit Archimedes micros are the first to use the Acorn RISC Machine (ARM) processor and its three specialised support chips. In fact, Archimedes is a range of four machines, only two of which are available now. The specifications of the machines were detailed in full in last month's *Acorn User*, but they range from the entry level A305 with half a megabyte of RAM and a single floppy disc, to the upmarket A440 four-megabyte machine with a 20Mb hard disc. Here we look in more detail at the entry-level A305.

Beginnings

Switch on the Archimedes and it emits not a 'beep' but a pleasing 'bong'. Put in the Welcome disc and press Shift-Break, and the machine boots up into the *Desktop* program. This allows you to manipulate the files on the disc; using the mouse to point at pictures, or icons, and select options from menus. The window showing the icons can be moved across the screen as shown in figure 2, shrunk or switched off, or expanded to be as big as necessary. The screen colours can be altered using the palette.

All this happens fast – much faster than equivalent programs like the Macintosh desktop or GEM desktop – yet the *Desktop* is written in Basic! Accessories like a clock, calculator, notepad and calendar are provided. Clicking the mouse twice on an icon runs that program.

Basic differences

Leaving the desktop by clicking on 'Quit', the familiar '>' Basic prompt appears. This is Basic version 5.

BBC Basic has grown up. The familiar language has been extended to include several new features, but most old BBC Basic programs will be compatible with the new machine.



Figure 1. *Desktop*, on the Archimedes' Welcome disc, allows easy access to ADFS

Major new structures have been added to the language. These include WHILE... ENDWHILE and CASE...ENDCASE, and IF statements that can be split over several lines.

WHILE loops and the CASE structure are similar to equivalents in other languages like Pascal. WHILE is like a REPEAT loop; the machine always does a REPEAT loop at least once, whereas a WHILE loop can be skipped entirely. CASE can select one of a number of options.

Commands like ELLIPSE, CIRCLE and RECTANGLE, plus FILL, make producing graphics simpler than using PLOT.

The COLOUR command has been extended too, to give simple control over the display colours. A preset selection of colours can be used in each mode – 64 colours are shown in figure 3 – or new colours can be specified in terms of their red, green and blue components. This allows any of the 4096 shades to be used. Figure 4 gives some idea of the subtle shading possible.

Basic procedure libraries are supported with an APPEND statement. This loads a file at the end of the current Basic program, and renumbers the program.

A major change involves the way in which variables are passed to procedures

Archimedes Archimedes Archimedes Archimedes Archimedes Archimedes Archimedes

A NEW GENERATION OF ACORN COMPUTERS FROM QUDOS.

ARCHIMEDES SPECIFICATIONS

CPU.
ARM (Acorn RISC Machine 4 mips).
RAM.
0.5 – 4.0 Mbytes.
ROM.
512 kbytes (subject to change).
MOS, ADFS, ANFS, Editor, Desk Top Window Manager.
DISPLAY.
(15.625kHz/50Hz non-interlaced).
Text 20 × 32 to 132 × 25.
Palette 4096 colours.
Graphics resolution up to 640 × 512 with 16 colours.
DISC DRIVE.
1 Mbyte (unformatted) 3½" drive.
PLUS.
RS423 serial interface Mouse, Centronics parallel interface.
8 voice digital stereo sound.
ADDITIONAL.
20 Mbyte hard disc.
Local Area Network. (ECONET)
COMPILERS AVAILABLE.
BBC BASIC V (standard), C, ISO-Pascal, FORTRAN, Lisp, Prolog.
Modula-2 Plus available soon.
TERMINAL EMULATION.
Teletype, VT52, VT100, VT220, Tektronix 4010.
PODULES.
User port, 1 MHz bus, A-D port, MIDI, MS-DOS, IEEE-488, Ethernet.



Over the last four years, Acorn have pioneered the development of RISC (reduced instruction set computer) architecture. The result is a machine that forms the basis of a new family of high performance computer systems from the company that has brought us innovation and quality on more than one million BBC Microcomputers.

The new Acorn Archimedes range combines speed (4 mips) and power equal to a network of IBM PCAT's with very fast, high resolution graphics, up to 4Mb RAM and 20Mb of disc storage. The extremely competitive price will make it the odds on favourite for business and low-cost technical workstation applications, as well as for educational and home use.

There are four models available, ranging from £799+VAT for the ½Mb version to £2499+VAT for the 4Mb hard disc version. To find out which machine is right for your particular application contact Qudos Limited, Acorns leading scientific products dealer. Our experience will make RISC technology a safe bet for you.

Coming soon, Acorn's new RISC based 'SpringBoard' PC applications card – VAX power on your PC or compatible for around £1000. Call Qudos for preliminary details.

QUDOS



Acorn Sales, Qudos Ltd, Cambridge Science Park, Milton Road, Cambridge CB4 4FD Telephone (0223) 862333. Telex 818114 Qudos G. Fax (0223) 862946

Products referred to are trademarks of the companies of origin.

and functions. With existing BBC Basic procedures, calling PROCdo(A%) means that PROCdo works not with A% itself, but with a copy of A%. So any changes made to the parameter within PROCdo are not made to the A% in the main program. This is described as 'passing by value' – only the value of A% is used in the procedure. In Basic 5, by using

DEF PROCdo (RETURN N%)

you can ensure that changes made to the parameter N% in PROCdo are passed back to A%. This is 'passing by reference' – in effect, the main program's A% is used in the procedure.

Procedures can now have local error trapping too. This is an ON ERROR statement that applies only to that procedure – the previous ON ERROR action is restored when the procedure is finished.

Basic 5 is generally compatible with previous versions of BBC Basic, and many of the Basic programs published in *Acorn User* will run without modification. The major area of incompatibility is sound. The new sound system doesn't have an ENVELOPE statement, but is controlled by TEMPO and BEATS commands.

Along with Basic 5 comes the ARM Basic Editor, much like the Basic Editor for the existing BBC micro. This gives you wordprocessor-like editing of a program using the function keys, and it deals automatically with line numbering and so on.

The assembler

Just like the standard BBC micro, the Archimedes has an assembler built into its Basic 5. Unlike the earlier BBC micros, it is not a 6502 assembler; it only assembles ARM mnemonics. But anyone with a reasonable knowledge of 6502 should have no problems moving across. This instruction set was described by Peter Cockerill in June's *Acorn User*.

In fact, apart from the mnemonics used, the whole process is identical to the familiar 6502 assemblers. When you are using ARM machine code with Basic, various integer variables have their contents moved across into the ARM registers when a CALL command is issued; A% is copied into R0, B% is copied into R1 and so on.

Within the operating system, old familiars like OSWRCH, OSBYTE and OSWORD are still present.

However, to call these routines, a new scheme first seen on the Acorn Communicator is used. Instead of JSR OSWRCH to write a character onto the screen, an SWI, or software interrupt instruction, is used.

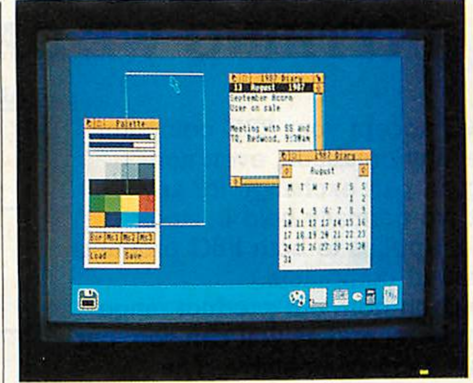


Figure 2. Windows can be moved on screen

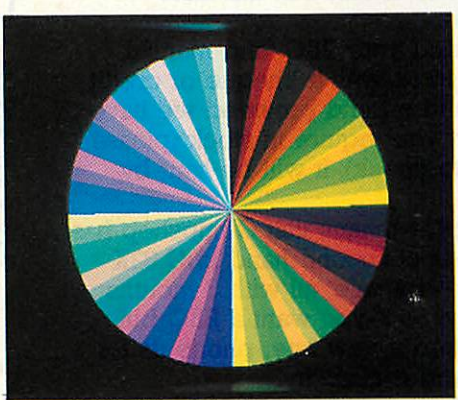


Figure 3. 64 of the default colours in mode 15

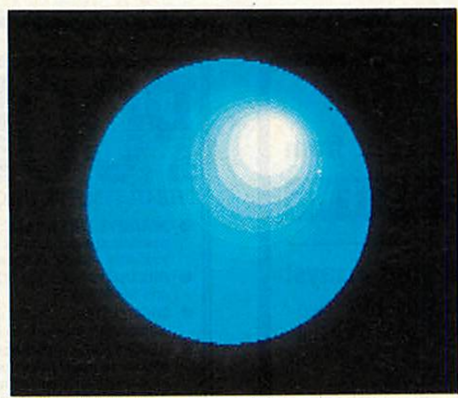


Figure 4. Shading gives a 3-D appearance

Each of the SWI calls has a number, and the equivalent of OSWRCH is number 0.

The following Basic program assembles some ARM machine code to add two numbers supplied from A% and B% together, then print the character corresponding to the result:

```
10 REM ARM assembler
20 DIM code &50
30 oswrch = 0 : osnewl = 3
40 :
50 FOR pass = 0 TO 3 STEP 3
60 P% = code
70 [ OPT pass
80 ADD R0, R0, R1 \ R0=R0+R1
90 SWI oswrch \ print CHR$(R0)
100 SWI osnewl
110 MOV R15,R14
120 ] NEXT
130 :
140 A% = 10 : B% = 65
150 CALL code
```

The MOS also includes monitor software to aid with debugging. This is used via a series of star commands – *DEBUG, *BREAKSET, *MEMORYA and so on, and allows the machine code to be stopped, memory to be inspected or altered and execution of the machine code to be resumed.

The Welcome disc also contains a relocatable module which allows most 6502 code programs to be run.

The emulator can run any legal 6502 program, just as if it were running in a second processor. This includes ROM images of the *View* family, Comal and so on, and even Basic 4 – so your Basic programs with 6502 assembler will work. The emulator runs most programs slightly slower than a normal BBC model B, but input and output are done at full (non-emulated) speed so overall performance is usually a little faster.

Hardware

Within the three neat pale grey and cream Archimedes boxes are a standard Philips monitor as supplied with the Master Compact, a 103-key keyboard with the layout resembling machines like the IBM PC-AT, and the Archimedes circuit board.

The keyboard is a fairly standard item for business computers, housed in a light plastic case with little legs at the back to tilt it to a comfortable position. One or two important keys are in the 'wrong' place: " and * have moved, and f0 seems to have gone altogether (in fact it's labelled Print). The major advantage is that there isn't the usual tangle of wires – just two leads for the mouse and main box. Only a preproduction keyboard was available for review, so the feel of the keys can't be judged.

Loosen two screws at the side of the main box, and remove three from the rear, and the metal top can be slid off. The box contains the circuit board, power supply, floppy disc drive, sockets for the keyboard, network, monitor and headphones, parallel and serial interfaces and a small fan. The internal layout of the machine is shown in figures 5 and 6. The disc drive sits on a small metal platform, and a second floppy drive or hard disc can be added to the platform next to the first.

The rows of RAM chips on the circuit board sit under the disc drive platform, and this board also has the extra 0.5Mb RAM upgrade chips fitted in the sockets provided. All the Archimedes machines are fitted with the same ARM processor, VIDC video controller, MEMC memory controller and IOC peripheral controller.

The optional podule backplane piece

PART EXCHANGE YOUR BBC



FOR ANYTHING WE CARRY IN STOCK

ARCHIMEDES ...... from £918.85
AMSTRAD
PC1512SD £516.35
PC1512DD £642.85
BBC MASTER 128 ...... £449.00
CUMANA DISK SYSTEMS
CSX100 .... £102.35
CSX400S £136.85
CS100 .... £125.35
CS400 .... £159.85
CD200 .... £188.60
CD800S £274.85
PRINTERS
CANON PW1080A £286.35
PJ1080A £485.85
EPSON LX800 .... £251.35
JUKI 6100 .... 320.85
6200 .... £516.35
MONITORS
MICROVITEC
1431 .... £193.20
1451 .... £251.85
1431AO £251.85
1451AP £286.35
PHILIPS 12" £90.85
PHILIPS MED RES COLOUR
.... £228.85
PHILLIPS Monochrome £79.35

We will accept your BBC computer, any age, any condition, even non-working, in part exchange for any product we normally hold in stock. This offer applies to both BBC products and Amstrad computers.

A selection from our product range is shown here, and as you can see, our prices are very competitive. The allowance you can expect for your machine is detailed in the table opposite.

Just send your BBC (and manual please) to us with a cheque or credit card number, and provided we have the item you require in stock (please phone to check), it will be sent by return.

This offer means that Compshop has a number of second hand BBC 32K machines for sale, all with 3 months warranty. So if you want a BBC but can't afford a new one, phone us for prices and availability.

ALL PRICES INCLUDE VAT

CARRIAGE ON ANY ITEM POST — £3.00 COURIER — £10.00

ALLOWANCE ON YOUR OLD MACHINE

	MORE THAN THREE YEARS OLD	THREE OR LESS YEARS OLD
WITHOUT ACORN DISK INTERFACE	£100	£150
WITH ACORN DISK INTERFACE	£150	£200

PLEASE DEDUCT £30.00 IF YOUR BBC HAS ANY REPAIRABLE FAULTS

COMPSHOP PRICE PROMISE — We guarantee to match the price on equipment offered from stock through any other supplier.

COMPSHOP was established in 1978 and has continually offered the best in micro computers to discerning customers.

Educational enquiries and orders welcome.

Quotations given.

One year warranty on all products.

We sell only computers and peripherals, and therefore can offer the support many other shops cannot.







14 Station Road, New Barnett, Hertfordshire, EN5 1QW
(Close to New Barnet BR Station – Moorgate Line)
Telephone: 01-441 2922 (Sales) 01-449 6596 Telex: 298755 TELCOM G
OPEN (BARNET) – 10am – 7pm – Monday to Friday
10am – 4pm Saturday
NEW BRANCH OPEN AT
311 London Rd, Camberley, Surrey GU15 3HE
Telephone (0276) 22677

Arraymate

from **FOSSE SYSTEMS**

for total control of your arrays!

Arrays are the fundamental data structure in BBC Basic – but they have their limitations. Now ***Arraymate*** is here to help you to realise their full potential.

With ***Arraymate's*** powerful 'star' commands at your fingertips, you can ...

- ★ **Sort an array into ascending or descending order – any array type, any number of dimensions.**
- ★ **Select the key elements to be used in sorting.**
- ★ **'Rotate' the contents of an array, up or down.**
- ★ **List dimensions and program references of current arrays.**
- ★ **Selectively erase an array.**
- ★ **Simulate passing array parameters to a procedure.**
- ★ **Safeguard all your variables while you edit your program, or even chain in a new one!**
- ★ **... and more!**

Arraymate is supplied on Eprom, and is compatible with BBC Model B, B+ and Master.

Only **£15.75** inc. p&p. 30-day money-back guarantee
Trade enquiries welcome.

Order now for immediate dispatch, from
FOSSE SYSTEMS, 3 The Chipping, Tetbury, Glos. GL8 8EU.
Tel (0666) 54477.



Please send me _____ ***Arraymate*** Eproms @ £15.75 each
I enclose a cheque/postal order for £ ____________
Name ____________ Address ____________

POOLSWINNER II

THE ULTIMATE POOLS PREDICTION PROGRAM

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **LEAGUE AND NON-LEAGUE** All English and Scottish League teams are supported, and also the non-league sides often used on pools coupons.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

Boxed, with detailed instruction booklet

PRICE £15.00 (all inclusive)



FIXGEN 87/8

AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish League fixtures for 1987/8. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner. Yearly updates available.

POOLSWINNER with FIXGEN £16.50 (for both)

COURSEWINNER V3

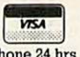
THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike. You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date. *FULL PRINTER SUPPORT.*

PRICE £15.00 (all inclusive) includes Flat AND National Hunt versions.

ALL PROGRAMS AVAILABLE FOR: AMSTRAD CPCs, AMSTRAD PCWs, PC1512, All BBCs, All SPECTRUMS, COMMODORE 64/128.
Supplied on tape (automatic conversion to disc) – except PCW and PC1512 (on disc – add £3.00).

Send Cheques/POs for return of post service to . . .



phone 24 hrs



SOFTWARE



phone 24 hrs

37 COUNCILLOR LANE, CHEADLE, CHESHIRE SK8 2HX. ☎ 061-428 7425
(Send for full list of our software)

plugs into the 96-way connector in the centre of the board, and a standard Master series Econet card can be plugged into the rear-left corner of the board.

The Arthur MOS

The system software of the Archimedes series divides into several overlapping sections: the MOS, the filing systems, the WIMP, sound, sprite and font managers and the 6502 emulator. Some aspects of the operating system are very familiar from earlier Acorn machines; other parts are totally new and mirror the facilities found on machines like the Apple Macintosh.

The release version of the MOS that will be in machines from September is 1.000 and needless to say it has been completely re-written to take full advantage of all the new features. Only an early version of this was available for the review, and some of the facilities that will be in the final ROM were provided on disc.

Of the new star commands, *SET, and those related to it are perhaps the most interesting. Basically *SET can be used to assign a string to a variable. For example:

*SET ARC "The Archimedes 305"

will create a variable called ARC which is assigned the string 'The Archimedes 305'. Note these are not Basic variables, but are used by the operating system – which is now a programming language on its own. It even has a *IF command!

Certain other variables are already assigned – these include:

CLI$PROMPT
SYS$TIME
SYS$DATE
SYS$RCLIMIT
SYS$RETURNCODE

For example entering:

*SET CLI$PROMPT "ARC>"

The normal '*' prompt will be replaced by 'ARC>'.

By using the system variable ALIAS$ it is possible to make new * commands too. For instance the MODE command is often used in Basic, but what is needed is a *MODE command. This can be defined using:

*SET ALIAS$MODE ECHO <22> <%0>

Now typing *MODE <n> where n is the mode number will have the effect of changing the screen mode. Alternatively, an alias can be used to change the name of a star command. If you are used to CP/M, then:

*SET ALIAS$ERA DELETE <%0>

could be useful. *SETMACRO is an extension of *SET.

Like earlier operating systems, there are vectors that allow new bits of code to replace old bits of the operating system. There are many familiar names and new additions including:

UKVDU23V – Unknown VDU23 vector
UKSWIV – Unknown SWI vector
UKPLOTV – Unknown VDU25 vector
VDUXV – Extra VDU vector
TICKERV – Vector called five times a second
UPCALLV – Warning vector
MOUSEV – Mouse vector

MEMORY MAP

logical address	function	
01FFFFFF		32Mb
	Screen memory	
01F88000		
	Unused	
01F08000		
	Cursor and sound work space	
01F00000		31Mb
	Operating system work space	
01C00000		28Mb
	Relocatable module space	
01800000		24Mb
	Sprite work space	
01400000		20Mb
	Reserved for RAM disc	
01000000		16Mb
	User memory	
00008700		32k
	Operating system work space	
00000000		0

The Archimedes memory map is complex: there are between 512k and 4Mb of physical RAM chips on the board, and 512k of ROM. But the range of addresses in use goes from &00000000 to &01FFFFFF. A memory map is shown above.

The range of addresses is far wider than the amount of physical memory, so not all of the memory map is actually 'there'. In fact, none of it is there! All the hardware is really addressed above &02000000, and the MEMC memory controller translates all the 'logical' addresses used by software into the correct 'physical' addresses used by the hardware.

So the beginning of, say, the sprite workspace might be at (physical address) &02040000, or it might be somewhere else – you never need to know. MEMC and the operating system sort this out automatically. If your software wants to access the sprite workspace, then you can always find it at (logical address) &01400000. Because not all the 32Mb of logical memory can be physically present, there must be holes in the logical memory map. If your software uses a logical address for which there is no physical translation, then an 'address exception' error is given.

Filing systems

Acorn's advanced disc filing system (ADFS) and advanced network filing system (ANFS) are standard in the Archimedes. The ADFS is normally the default filing system and those familiar with the existing ADFS should have no problems. Several new commands have been implemented. Those common to both ADFS and ANFS are as follows:

* ENUMDIR – Reads entries from a given directory and copies them into a specified file
* OPT 4,1 – This now *RMLOADs the !Boot file
* STAMP – Used to set the date/time stamp of an existing file
* UP – Moves up the directory tree

Two formats of ADFS disc are available. The large (L) format, giving 640k of storage, is compatible with discs from the Master Compact, and other BBC micros using ADFS and 3.5-inch discs. The new double (D) format uses the same disc, but with only five sectors at 1024 bytes giving a total disc capacity of 800k. The choice of format need only be taken when formatting a disc – once this is done, reading whichever format it is done automatically.

Window Manager

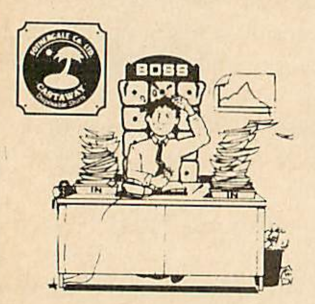
The operating system provides all the facilities for an environment based on windows, icons, menus and pointers. These are used by the Archimedes desktop supplied on the Welcome disc. There are 24 system calls to facilitate this. They operate rather like OSWORD calls in that you set up a parameter block in memory containing various bits of information and then load register R1 with its address. Then the appropriate window manager call is made using the SWI instruction.

Windows are handled rather like files on existing BBC micros in that they are assigned handle numbers. To manipulate a particular window you must specify its handle number in the parameter block. Windows are opened and closed, and the software deals with the interaction of the windows, the mouse cursor and the Select, Menu and Adjust buttons on the mouse.

The Font Manager provides all the facilities for painting characters in different sizes and fonts onto the screen. The fonts are

RBRC SOFTWARE

- Hands on Experience in Business Dynamics.
- Live Business Simulations.
- The teams (as boards of directors) have to cope with all aspects of managing the business.



Crisis Management

Fothergale Co Ltd, makers of the 'Castaway' disposable shirts.

For sixth formers (16-19)

£60 + VAT p&p

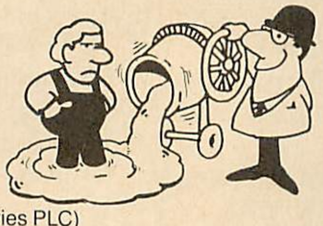
The Cement Business Game

The Goliath Cement Co Ltd, a small independent cement maker coping with all its problems.

For fifth and sixth formers (15-18)

(Sponsored by Blue Circle Industries PLC)

£30 + VAT p&p



"Beat the BOSS"

An introduction to business dynamics, and to "Crisis Management". For fourth to sixth formers (14-17)

£30 + VAT p&p

All 80 track DFS for BBC/B, Master, Compact, 'Nimbus'.

"Crisis Management" has comprehensive tutor's manual that covers all three simulations. **"Beat The BOSS"** has a special tutor's guide. All three have players' guides

SPECIAL OFFER

All three simulations for £98.50p plus VAT and p&p

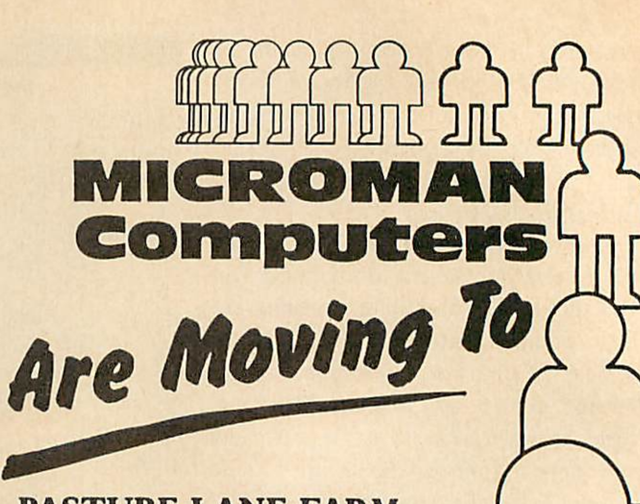
Normal retail price for all three £120 plus VAT and p&p

Offer valid for all orders received by 7th December 1987

From: RBRC Software
Guild House
32 Worple Road
Wimbledon SW19 4EF

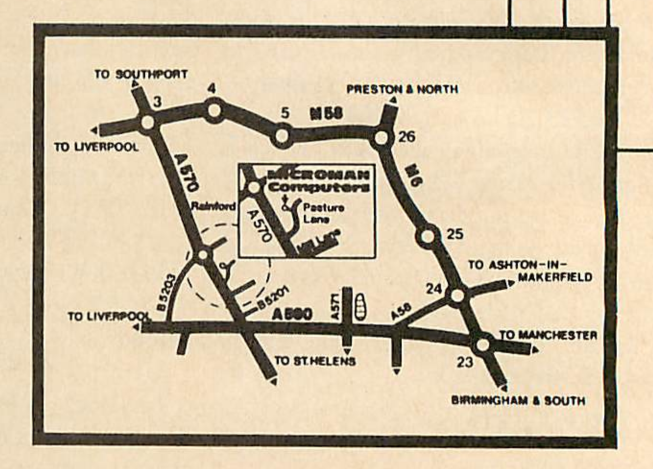


Telephone: 01-946 8641



PASTURE LANE FARM,
PASTURE LANE,
RAINFORD, ST. HELENS,
MERSEYSIDE, WA11 8PU

PLEASE NOTE NEW
SATURDAY OPENING TIMES
9-6 MONDAY TO FRIDAY
9-1 SATURDAY



DATE OF MOVE
1st SEPT 1987

OUR PHONE NUMBER WILL REMAIN
074488 3667

essentially graphical – unlike the eight by eight BBC character set used for normal printing.

To allow the graphical fonts to be printed at any size, pixel definitions of the fonts in various sizes are provided. When a size of font is requested that is not present in the form of a pixel definition, then the font manager will automatically scale a font to meet the requirements.

An anti-aliasing technique is employed with shades of grey used to fill in pixels that should only be half-filled in. This can lead to a smudged, fuzzy look in some sizes. Fonts are defined with 16 shades of grey, but can be printed in fewer shades when used in modes with fewer colours available.

The operating system reserves an area of memory for sprite definitions, and there are VDU and star commands for loading and saving, plotting and editing the sprites. The sprite system is compatible with that of the GXR and Master Compact *Spriter* ROMs. New commands *SCREENSAVE and *SCREENLOAD allow the whole or part of the screen to be simply saved to a file.

One of the most interesting features of the BBC micro range was its implementation of sideways ROM and RAM. Neither of these are present on the new machine, other than through a ROM podule. Instead extensions to the OS are added using 'relocatable modules'. These are ARM machine code which, like sideways ROM and RAM, follow a specified format. The first few bytes in the module form a header which provides the MOS with all the information it needs to use with the module. Once loaded with *RMLOAD, all the * commands associated with the module can be used. Modules can be considered as software extentions of the MOS.

A list of modules installed in the machine can be obtained using the *MODULES command. Other module orientated commands that are of interest are *RMCLEAR to delete all modules installed, *RMKILL to delete just the specified module and *RMRUN to run the specified module.

Obviously the modules eat into user memory. The amount given over to them can be defined using the *CONFIGURE RMASIZE command. If you should try to load in too many modules, an error message is displayed. In this case you can either delete modules or increase the RMASIZE.

Acorn are getting the ball rolling by announcing four podules – small add-on circuit boards that slide in the rear of the micro, providing it has a backplane.

First the ROM podule. This will accept

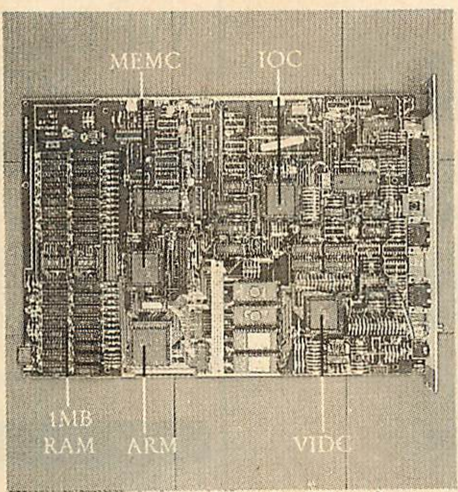
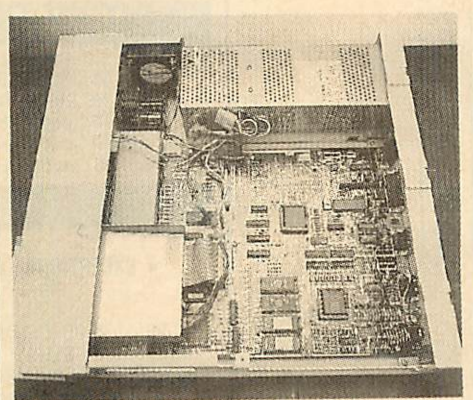


Figure 5. Vital parts of the circuit board


Figure 6. Solid internal construction

ROMs of 16k upwards, and also RAM chips which may be battery backed. Providing the ROM is legally written, then even BBC micro ROMs should work, at least under the emulator. *View 3* is an example.

The I/O podule provides the connections to the rest of the world. You get an analogue port, a user port based on the trusty 6522 VIA and a 1MHz bus. The sockets are the same as those used on the BBC micro range and so all those peripherals should be able to connect and be used, though the software might need to be adapted. A MIDI interface is also planned as an upgrade for this podule, with the additional MIDI software being on ROM.

The third planned podule is the hard disc upgrade, at a cost of £574 including VAT.

There are also plans to produce an MS-DOS podule, to allow the Archimedes to run standard IBM PC software. This will be similar to the Master 512 co-processor. Acorn has written a software emulation of the IBM PC similar to the 6502 emulator, but this runs slowly compared with the real thing, and a podule with its own processor should offer much better performance.

Two manuals are supplied with the Archimedes: the Welcome Guide and the User Guide. The Welcome Guide describes how to plug the micro together and use some of the disc-based utility programs such as the font designer.

The 456-page User Guide follows the standard Acorn format, describing the machine's facilities in a step-by-step manner. But anyone planning to program in anything other than Basic will be left scratching their head.

The hefty *Programmers Reference Manual*, at the equally hefty price of £19.95, provides just about all the hard facts you're ever likely to need. Unfortunately that's all it does: no examples are given to show you how to use the numerous system calls which means there's much hair-tearing as you struggle with the mass of information.

Impressions

There can be little doubt that Archimedes is the biggest step Acorn has taken in the micro market since the launch of the original BBC micro five years ago. And in terms of the hardware, the step has been successful. After some time with the machine, it's hard to fault it or find an aspect of its performance that compares unfavourably with the competition – and that means any micro up to £5000.

First impressions count heavily in a shop: the keyboard could be better, and the lack of a bundled wordprocessor looks like cheeseparing in a £1000 micro. But the speed of the machine is astonishing.

As to software, so far there is very little, and the best will take some time to appear. Acceptance of the Archimedes in the home market depends heavily on the appearance of software that makes use of the power of the machine: conversions of old software to run under the 6502 emulator simply won't do, because they are subject to the same performance limits as the original BBC micros. Although new applications are on their way, other machines like the Macintosh and Amiga have a head start.

The computer press has in the past been quick to knock Acorn for its retention of eight-bit technology. But the sales success of that technology has paid for the development of this 32-bit machine. Now we have a micro that is potentially a world-beater and should run most BBC Basic programs.

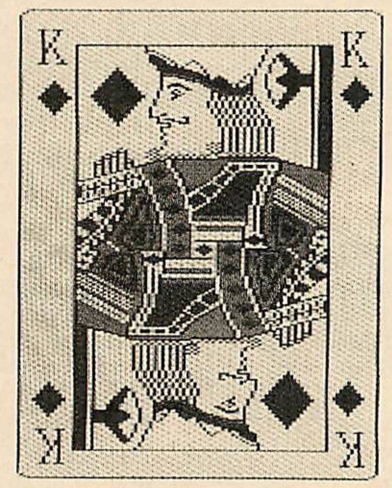
At around £1000, it's a rather larger step than one is used to in the BBC world. But with five times that amount to spend you can't get anything else that even comes within hailing distance.

Acorn has put itself at the top of the tree again. Atari, Amiga, Amstrad and Apple users – eat yer hearts out!

SUBSCRIPTION

AU OFFER

Two free issues of Acorn User



Acorn User gives you more for your money – every month you get up-to-the-minute news, informative features, product reviews, useful programs and a range of hints and tips for all the BBC and Acorn micros – more than you get from any other user magazine.

And by subscribing today you will receive even more – two full issues absolutely free! We will send you 14 issues for the price of 12. Guarantee the delivery of your *Acorn User* magazine now and enjoy the best editorial, news, comment and programs.

Acorn User is the only way to ensure that you are kept up to date with the ever changing world of the BBC/Acorn micro, so have it delivered direct to your home.

This offer is only open to UK readers, our overseas readers should turn to page 122.

YES! Please start my subscription for 14 issues of *Acorn User* with the ______________________ issue.

NAME ______________________

ADDRESS ______________________

____

POSTCODE ______________________

☐ I enclose my cheque/postal order made payable to Redwood Publishing Ltd for £17.50.

☐ Please debit my Access/Barclaycard/American Express

ACCOUNT NO: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ EXPIRY DATE ☐☐☐☐

SIGNED ______________ DATE ______________

Send this coupon with your remittance in an envelope to Gail Fairhall, Subscriptions Manager, Redwood Publishing Limited, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.

PLEASE READ THIS

WHOLESALE PRICES TO YOU THE USER

BUY 5.25" DISKS

Plain label by leading manufacturers, i.e. R.P.S., Wabash etc.

	25	50	100	200	500
SS/SD 48TPI	£10.00	£19.00	£35.00	£68.00	£164.00
SS/DD 48TPI	£10.50	£20.00	£38.00	£74.00	£174.00
DS/DD 48TPI	£11.00	£21.00	£40.00	£78.00	£190.00
DS/DD 96TPI	£11.50	£22.00	£42.00	£82.00	£200.00

All above inc. envelopes, labels sets and hub rings
UK MADE Library cases bought with above only £0.95p EACH

Special Offer:
Buy 100 SS/DD 48TPI Disks without envelopes for ONLY £33.00

3½" DS/DD DISKS

Plain label. Made in Japan

10	20	50	100	200
£17.00	£32.00	£72.00	£138.00	£270.00

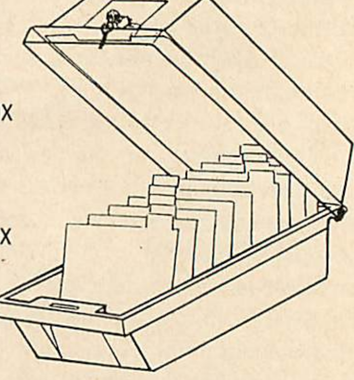
LOCKABLE DISC BOXES AND LIBRARY CASES

5¼" 10 Capacity REF. VIS 10 Library Case	£ 1.30	
5¼" 50 Capacity REF. YA50L	£ 7.50	**Disc for qty.**
5¼" 100 Capacity REF. YA100L	£10.00	10% for 3+
3½" 10 Capacity REF. MCS 10	£ 1.30	20% for 6+
3½" 40 Capacity REF. YA40L	£ 8.50	25% for 12+
3.5" 90 Capacity REF. YA6090	£9.75	

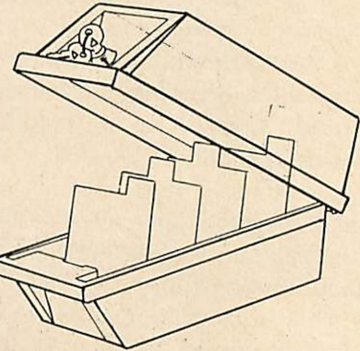
SPECIAL OFFERS

★ EXCEPTIONAL VALUE ★

25 5.25" DS-DD DISKS
PLUS
100 CAPACITY LOCKABLE DISK BOX
FOR **ONLY £18.75**
OR
50 5.25" DS-DD DISKS
PLUS
100 CAPACITY LOCKABLE DISK BOX
FOR **ONLY £30.75**



20 3½" DS-DD DISKS
PLUS
40 CAPACITY LOCKABLE BOX
FOR **ONLY £36.00**
OR
50 3½" DS-DD DISKS
PLUS
90 CAPACITY LOCKABLE BOX
FOR **ONLY £78.00**



REMEMBER THE PRICES YOU SEE IS ALL YOU PAY. THEY INCL. VAT & CARRIAGE
CHEQUE OR POSTAL ORDER TO:

Manor Court Supplies Ltd



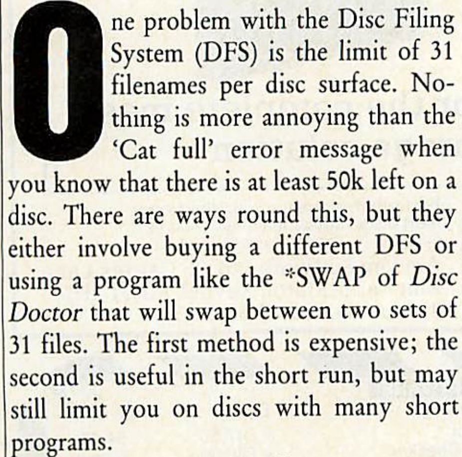
DEPT. AU9 GLEN CELYN HOUSE, PENYBONT, LLANDRINDOD WELLS, POWYS LD1 5SY
Telephone: 0597 87784/0597 87792

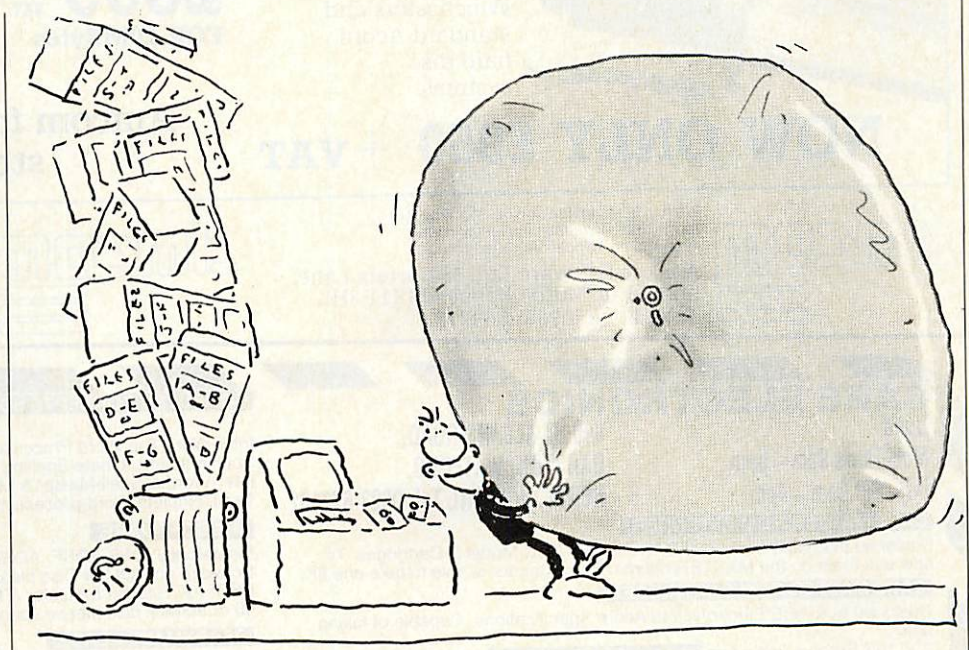
ORDERS ACCEPTED FROM EDUCATIONAL & GOVERNMENT DEPTS.
DEALER INQUIRIES INVITED
SCANDINAVIAN COUNTRIES PLEASE CONTACT OUR AGENT FOR PRICES
MAGNUM DATA, PO BOX 627, N-5001 BERGEN, NORWAY.

FILLING OUT FILES

Free yourself from limitations with this program which increases the number of filenames you can get on a disc

David Lawrence





One problem with the Disc Filing System (DFS) is the limit of 31 filenames per disc surface. Nothing is more annoying than the 'Cat full' error message when you know that there is at least 50k left on a disc. There are ways round this, but they either involve buying a different DFS or using a program like the *SWAP of *Disc Doctor* that will swap between two sets of 31 files. The first method is expensive; the second is useful in the short run, but may still limit you on discs with many short programs.

To get more than 60 filenames, a completely different system must be used. My program will give you a maximum of 128 using a standard Acorn DFS. The code as provided runs from sideways RAM (SWR) but could equally well be blown into an EPROM and fitted permanently into your computer! This code does *not* replace your DFS – it is only an extension to it, and all normal DFS commands are still available.

Listing 1 on the yellow pages is the complete source code for the DFS extension. Enter the program and save it before running it. When run, the code will be assembled to &5000. If you have Basic 2 or a Master series micro, you can delete all references to 'D%', replace the functions equb, equw, equd and equs with EQUB, EQUW, EQUD and EQUS and change the first line in 'PROCassemble' to:

```
FOR I%=4 TO 6 STEP 2: P%=&8000:O%=&6000
```

This then makes use of the assembler extensions in Basic 2. Once assembled, a number of checksums are performed on the code and any errors will be reported along with a range of lines to be checked. Double check that section of codes and if possible ask someone else to check it, as it is very easy to miss something obvious. When the checksums are correct, the program will ask you to insert a disc on which to save the final code and will then save it.

You can now load the code into SWR in the usual way. Consult your SWR user guide for how to do this. Press Break and then type *HELP; a message similar to the following should be displayed:

```
DFS 0.9
  DFS
  UTILS

128 file DFS extension

OS 1.20
```

The exact wording will depend on which ROMs you have fitted.

Now try *HELP 128; this will list the new commands available:

```
128 file DFS

  *LOG
  *PUT file/*,<start,len>
  *GET file/*
  *INIT
  *ERASE
```

The commands provided are fairly limited, but should prove adequate for most uses. Here is a description of each one along with examples.

*INIT

Before you can store 128 files on a disc, you must specially format the disc. First format a blank disc in the usual way. If you have a standard Acorn DFS this will be with a utility program, while other DFSs may have a built-in formatter. In either case the command will be something like *FORM40 or *FORM80 depending on the number of tracks your drive has. The 128 extension

ILLUSTRATION BY IAN DICKS

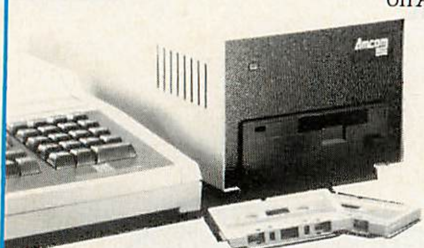
WINCHESTER USERS - Discard the Soft Option

MASS DATA STORAGE - The Complete Solution

At last, a real solution to the problems of hard disc back-up — the new Amcom Tapestreamers.

Amcom Tapestreamers provide a fast, reliable and economic means of backing-up the large amounts of data stored on Winchester hard disc systems. The speed and ease with which data is streamed onto magnetic tape makes backing-up faster, easier and more convenient with total Data Integrity. Multiple copies are easy to make, and data is quickly transferred back to the hard disc when required.

Amcom Tapestreamers are available to run not only on Amcom's definative E-Net Winchester based networks, but also on Amcom's new ADFS compatible Winchesters and standard Acorn hard disc systems.



NOW ONLY £950 +VAT

With more experience than any other company in the provision of hard disc storage for BBC users, Amcom can supply a range of ADFS compatible winchester drives, second to none.

With storage capacities of up to 600 megabytes, Amcom winchesters are designed for use in demanding environments like schools, colleges, and universities as well as for industrial applications.

Connection of an Amcom winchester couldn't be simpler as it connects directly to the 1MHz bus socket of the computer by a 34-way cable. Plug in, switch on, and that's all there is to it.

NOW ONLY £599 PLUS VAT FOR 20MBytes



Amcom for the complete mass storage solution



For further information on: Winchester hard discs, Educational networking systems or Tapestreamers, contact:
Amcom Software Ltd. 35 Carters Lane, Kiln Farm, Milton Keynes MK11 3HL.
Telephone (0908) 569212



For further information on: Winchester hard discs, Educational networking systems or Tapestreamers, contact:
Amcom Software Ltd. 35 Carters Lane, Kiln Farm, Milton Keynes MK11 3HL.
Telephone (0908) 569212

CARE ELECTRONICS

Open
Mon-Thurs 9am – 5pm
Fri – Sat 9am – 4pm

800 ST ALBANS ROAD, GARSTON, WATFORD. HERTS. WD2 6NL Tel: 0923-672102

CARE MASTER ROM EXTENDER:

Designed to enable owners of CARE/Viglen BBC Model B Cartridges. To now use them on the MASTER micros. The extender is able to take one 8K,

CARE MASTER ROM CARTRIDGES:

Designed by CARE Electronics to Acorn Specifications. Capable of taking upto 2 × 16K Eproms. Including Inter-word & Spell-Master. CARE Cartridges offer 2 or 4 × 16K options for maximum user flexability. Opt 1: Standard Cartridge: Opt 2: Single Zif. Opt 3: Dual Zif. Opt 4: Quad Sockets

CARE MASTER SMART CARTRIDGE:

Freeze Prog at any point and dump Screen to Disc/Printer, Copies 99% of Protected programs. Tape-Disc, Disc-Tape, ASCI Dump and much, much more.

	Price Each = Ex VAT:	Inc VAT.
CARE Master ROM Extender	@ £ 9.00	10.35c
CARE BBC Model B Cartridges	@ £ 3.00	3.45c
CARE BBC Model B ZIF Cartridge	@£ 7.00	8.05c
CARE LOW Profile System (The Original)	@ £11.00	12.65d
CARE Library Rack (Holds 6 Cartridges)	@ £ 1.60	1.84c
CARE Master Quad Cartridge	@ £13.00	14.95c
CARE Master ROM Cartridge	@ £ 8.00	9.20c
CARE Master single Zif Cartridge	@ £12.80	14.72c
CARE Master dual Zif Cartridge	@ £17.00	19.55c
CARE Master Smart Cartridge	@ £34.60	39.79c

POWER SUPPLIES:

For use with Disc Drives (Not old full height type) Dual BBC Outlets	@ £30.00	34.50b
For use with most peripherals Quad BBC Outlets	@ £33.00	37.95b

CARE PRINTER BUFFER:

(For Master & Compact/Model B & B+)
Uses SRAM, Spare I/O, User Definable.

Rom Version	@ £14.00	16.10d
5.25" Disc Version	@ £13.00	14.95d

GOVERNMENT & EDUCATION ORDERS WELCOME. HOW TO ORDER:

All prices inclusive of VAT. By post. Enclose your cheque/P.O. made payable to CARE Electronics. Or use your ACCESS/VISA.
Please allow 7 days for delivery.
Please add carriage. a = £10.35 b = £5.75 c = £1.15 d = £2.30

Access BARCLAYCARD VISA

COMPUTER CONCEPTS SOFTWARE:

	Ex VAT:	Inc VAT
Inter-Word The Word Processor	@ £47.50	54.97c
Spell-Master Ultimate Spelling Checker	@ £50.00	57.50c
Inter-Word & Spell-Master & Master Cartridge. The Complete Word-processing package	@ £97.00	111.55d

M/B SOFTWARE:

Mastercopy (DFS-ADSF, ADSF-DFS, DFS-DFS, ADSF-ADSF) Software on ROM or Disc please specify	@ £13.00	14.95c
DESFAX Teletext Emulator (The FAX system) 40 or 80track disc please specify	@ £21.40	24.61d

READYMADE LEADS:

Centronics to Centronics	1.5mt	@ £11.00	12.65c
Disc Drive Data (Single)	1.2mt	@ £ 6.00	6.90c
Disc Drive Data (Dual)	1.5mt	@ £ 8.00	9.20c
Disc Drive Power (Single)	1.2mt	@ £ 3.00	3.45c
Disc Drive Power (Dual)	1.5mt	@ £ 5.00	5.75c
Printer (BBC to Centronic)	1mt	@ £ 6.00	6.90c
Printer (BBC to Centronic)	1.5mt	@ £ 7.00	8.05c
RGB 6-7 pin DIN (Hitachi)	1.2mt	@ £ 6.20	7.13c
RGB 6-7 pin DIN (Ferguson)	1.2mt	@ £ 6.20	7.13c
RGB 6 pin to SCART (Euro)	1.2mt	@ £ 8.20	9.43c
User Port Extension Skt to Plug	.5mt	@ £ 9.00	10.35c
Printer Extension Skt to Plug	1mt	@ £ 10.20	11.73c
1MZ Bus Extension Skt to Plug	.3mt	@ £ 10.40	11.96c

Many other cables available.

SWITCHING UNITS:

1 MICRO INTO 2 PRINTERS

1 PRINTER INTO 2 MICROS

BBC Printer 2 to 1 (Inc Lead)	@ £ 29.00	33.35d
BBC Printer 6 to 1	@ £ 71.00	81.65d
Centronics 2 to 1 (Inc Lead)	@ £ 33.00	37.95d
Centronics 4 to 1 (Inc Lead)	@ £ 70.00	80.50d
Centronics 2 to 2: x switches	@ £ 70.00	80.50d
Printer 2 to 2 'CPX2 Fully Buffered'	@ £ 60.60	69.69b
User Port 2 Way & Off Posn (Inc Lead)	@ £ 33.00	37.95d
User Port 6 Way & Off Posn (Inc Lead)	@ £ 72.00	82.80d
RGB Switcher 2 to 1	@ £ 20.20	23.23d
RS423 2 to 1	@ £ 20.20	23.23d

MORLEY ELECTRONICS PRODUCTS:

Teletex Adaptor ATS Software on ROM	@ £ 86.94	99.98d
Eprom Programmer Software on ROM	@ £ 30.00	34.50d
Care Deluxe Eprom Programmer capable of programming C'Mos & Standard Eproms 2716, 2732, 2764, 27138 & 27256 Software on ROM	@ £ 33.00	37.95d

```
Sector 0

        Bytes   00-07   First eight characters of disc title
        Bytes   08-0E   Filename 1
        Byte    0F      Directory of filename 1
        Bytes   10-16   Filename 2
          ..              ..

Sector

        Bytes   00-04   Last four characters of disc title
        Byte    05      Eight times number of files on disc
        Byte    06      Top nibble is the *OPT 4,n option
        Bytes   06-07   (Bottom nibble of 06) Number of sector on disc
        Bytes   08-09   Load address of filename 1
        Bytes   0A-0B   Exec address of filename 1
        Bytes   0C-0D   Length of filename 1
        Byte    0E      Bits 7-6, high order bits of load address
                        Bits 5-4, high order bits of exec address
                        Bits 3-2, high order bits of length
        Byte    0F      (and bits 1-0 of 0E) Start sector of filename 1
        Bytes   10-11   Load address of filename 2
          ..              ..
```

Figure 1. Standard Acorn DFS Track 0

```
Sector 0

        Bytes   00-07   First eight characters of disc title
        Bytes   08-0F   '128 DFS ' to identify disc as a 128 DFS disc
        Bytes   10-F7   Undefined
        Byte    F8      Next track with free space
        Byte    F9      Next sector free within track
        Byte    FA      Next catalogue sector with free space
        Byte    FB      Next free line in catalogue sector
        Byte    FC      Number of tracks on disc
        Bytes   FD-FE   Number of free sectors on disc

Sectors 2-9

        Bytes   00-0B   Filename 1 (12 characters)
        Byte    0C      Start track for file 1
        Byte    0D      Start sector for file 1
        Byte    0E      Load address of file 1
        Byte    0F      Length of file 1
        Bytes   10-1B   Filename 2 (12 characters)
          ..              ..

Sector 1 is unused apart from data to make '128 DFS ' use up
the whole disc, ie file length &31E00 on 80-track, &18E00 on 40-track
```

Figure 2. 128 DFS catalogue layout (Track 0)

works equally well with 40 or 80 tracks.

When this is done type *INIT (a 128 DFS command). The disc will whirr and you will be asked: 'xx track initialise -- Sure? (Y/N) :' where 'xx' is 40 or 80, the number of tracks. If you press 'N' then nothing will happen, so press 'Y'! The disc will whirr again and the numbers zero to nine will be displayed. The disc will now be a '128 DFS' disc. If you catalogue the disc in the normal way this will be displayed:

```
(00)
Drive 0                 Option 0 (off)
Directory :0.$          Library :0.$

   128 DFS   L
```

The file 128 DFS takes up the whole of the disc and you will therefore not be able to save anything else onto the disc. The name also acts as an identifying mark for the disc and the 128 DFS will not allow you to use *LOG, *PUT, *GET and *ERASE on a disc that does not have this file on it.

Once a file is initialised, you are now ready to save programs on the disc. The command that does this is *PUT. This is in essence the same as the standard command *SAVE but isn't quite as versatile. The best way to describe the command is for me to give you an example:

*PUT Test Prog,19,1C

This would save the block of memory from &1900 to &3500 under the filename 'Test Prog'. Points to note are:

■ The filename can be up to 12 characters long and spaces are allowed. Capital letters and lower case are also distinct, so you can have 'FRED', 'fred' and 'fReD' as different files on the same disc.

■ The two parameters taken by *PUT (19 and 1C) are both hexadecimal numbers and must both be two characters long. They refer to the first 'page' to save and the length of the file in whole 'pages'. A page is a block of 256 bytes, so the above command is similar to:

*SAVE TEST 1900+1C00

It is not possible to specify more accurate addresses as you can in *SAVE, eg, 1945+1CD1), nor to give an end address instead, eg, *PUT TestProg,19,35 – this would save a (hex) block &3500 long. So to save a Basic program, its PAGE value and its length rounded up to the nearest 256 bytes must be found. These can be obtained by typing:

```
PRINT ~(PAGE/256),~INT((TOP-PAGE)/256+.5)
```



These two values can then be used in *PUT. If either of these values is only a single digit, it must be preceded by a zero. So '6' becomes '06'. If you don't give the right number of parameters or if you miss a comma, you'll be given an error message and will have to try again. If all goes well, the disc will whirr and the file will be saved.

■ There are two other 'advanced' features of *PUT, the first being if the start and length parameters are missed off completely, no error will occur, but instead the DFS will attempt to find a file on the disc with the same name as the one in the *PUT and will then save over this file using the same parameters. For instance in the above example, if there had already been a 'Test Prog' saved on the disc with *PUT Test Prog, 19, 1C and you typed *PUT Test Prog then the old 'Test Prog' would be saved over the parameters of &19 and &1C. If no file with the same name is found, a 'File not found' error will be given. The other feature is that if a Basic program name begins with a '!', it will automatically run when it is loaded back in. PAGE will also be set to the value set by the first parameter. So if *PUT !Demo, 40, 05 had been used to save a Basic program five blocks long at PAGE=&4000, when it was loaded back in PAGE would be set back to &4000 and the program would be run like Basic's CHAIN command.

To find what files have been saved on a 128 DFS disc, type *LOG. This is a cross between *. and *INFO *.* on the standard DFS. If you had done the *PUTs in the section above and then tried *LOG, the following would be displayed:

```
TestProg      19 1C    !Demo          40 05
002 files.      &02F4 free sectors
```

*LOG catalogues the disc, and shows the start and length of each file (as specified in *PUT when it was saved). The number of files used and the number of free sectors (in hex) is also displayed. A sector is a block of 256 bytes on the disc, so this could be interpreted as the number of 'pages' left on the disc.

The *GET command loads saved files back in. This is much simpler to use than *PUT and simply involves typing *GET followed by the filename you wish to load. For example *GET TestProg loads 'TestProg' and *GET !Demo loads '!Demo', sets page to &4000 and runs it.

First-Class Utility Software & Printers from the Professionals.

CJE Micro's are an official ACORN approved dealer.
A wide range of accessories and software for ACORN, Amstrad and Atari computers are on display in the CJE Micro's retail showrooms.

CJE Micro's Unbeatable in print.

Multi-Font NLQ

("Very good package . . . Saved me over £100")
V. BUNCE, OXFORD. DEC 86.

Upgrade your printer to NLQ with a choice of many fonts. Up to 49 predefined fonts are available on 4 discs, or you can design your own. Multifont is easy to use and compatible with nearly all software. For prices see below or ring for further details on 0903-213361.

Some of the fonts available are shown here:

This is STANDARD
This is COURIER
This is ITALIC
This is GOTHIC
This is COMPTS
This is BOLD
This is SHADOW
This is OUTLINE
This is BROWAYE
This is THEATRE

CJE Welcome EXPORT and TRADE ORDERS – inquire for delivery costs.
Phone/Credit Card and Official Orders are accepted. Please ring for all the latest information and prices on 0903-213361.

FONTAID

("Good value . . . Useful buy")
BEEBUG MAY 87.

Fontaid is a must for any Canon or Kaga Taxan owner. 60 predefined fonts are available or you can design your own. A Star NL10/NX15 version is also now available, so inquire for further details.

"Impressed... Delightful Simplicity... Easy to use"
(MICRO USER JUNE 87)

INFORM from CJE Micro's.

This unique sideways RAM information system is quick, versatile and simple.

NOW – Solidisk 256K version is also available.

Master Writeprotect/ROM select switch.

"I cannot praise it enough . . . Worth buying!!" MICRONET 800116575

This switch system selects RAM protected, RAM unprotected or ROM. Each bank is separately switchable. This is the MOST POWERFUL switch unit available at only £15.00 inc VAT. (p & p £1.00 extra).

CJE micro's

CJE Micro's (Dept AU9), 78 Brighton Road, Worthing, W. Sussex BN11 2EN. Tel: 0903-213361.

SOFTWARE PRICE LIST

All prices include VAT, but please add £1.00 for postage/packing and state 40, 80 track or 3½" ADFS when ordering.

MFNLQ	**£30.00**
Font Discs B, C & D each	**£15.00**
Fontaid	**£30.00**
Fontaid with 6264 RAM	**£36.00**
Font Discs A, B, C, D, EA & Lang each	**£15.00**
Inform	**£20.00**

PRINTERS

Delivery on all printers is free. Ring for a sample printout, specification and the latest prices.

The following Near Letter Quality printers all come with centronics interface, friction and tractor feed.

Panasonic KXP1081	**£180.00**
Canon PW1080A	**£270.00**
Star NL10	**£260.00**
Star NX15	**£410.00**
Star NB24/10 (216cps)	**£599.00**
Juki Daisywheel	**£330.00**

Free delivery on printers

CJE Printer packs
The CJE packs include; Cable, delivery, paper, plug, utility software and booklet. Please ask for further details.
The Printer packs cost £15.00 with printer: e.g. NL10 + pack = £260 + £15 = £275 inc. VAT.
BBC Cable if purchased separately is £8.00. Software on its own: £11.00 + £1 p&p.

Blk + 0	Drive
Blk + 1	
Blk + 2	Address to load to
Blk + 3	or save from
Blk + 4	
Blk + 5	3 (number of parameters)
Blk + 6	&4B for save, &53 for load
Blk + 7	Start track
Blk + 8	Start sector
Blk + 9	&20 + number of sectors to load

Call with A%=&7F : X%=Blk MOD 256 : Y%=Blk DIV 256:CALL &FFF1

After call, Blk + 10 = 0 if successful.

'.load' and '.save' are called with :
X = Track, Y = Sector, A = (Addr DIV 256)

Figure 3. Use of the CALL Osword &7F command

Offset	40-track	80-track	Use
&F8	&01	&01	Next free track
&F9	&00	&00	Next free sector
&FA	&02	&02	Next catalogue sector
&FB	&00	&00	Next line in sector
&FC	&28	&50	40 or 80-track
&FD	&01	&03	No of free sectors
&FE	&85	&15	
&FF	—	—	Not used

Figure 4. Information stored in track 0 sector 0 by * INIT

If a '*' is typed as the last character of a *GET command, the DFS will search for the first filename that matches the letters before the '*'.

This wildcard system also works when using *PUT with no save parameters. So *PUT Terr* would save over the first file starting 'Terr'.

*ERASE

The only way you can delete files from a 128 DFS disc is by using *ERASE. Note that you don't specify a filename to delete, *ERASE simply erases the last file you saved, you will be prompted first with the name of the file and asked if you are sure you want to delete it. For example, *ERASE might produce the following message:

Terrorhawk -- Erase? (Y/N) :

Pressing 'Y' will delete the 'Terrorhawk' file and pressing 'N' will do nothing.

That completes the description of the commands and should be sufficient for you to use the utility. The extensions only use drive 0 – this can't be changed.

Don't forget to *INIT the discs before you use them; you'll get an error message if you try to access a non-128 DFS disc with *PUT, *GET, *LOG and *ERASE.

In order to understand the program, it is helpful to know how the 128 DFS stores its files and how this differs from the standard Acorn format. Figure 1 on page 89 shows the layout of the first two sectors of the first track under the Acorn standard. The actual programs or data are stored sequentially from track 0 sector 3 onwards. My DFS uses the whole of track 0 for catalogue information, with programs stored from track 1 sector 0 onwards. Figure 2 shows the layout of track 0 of a 128 DFS disc.

The first section of code (from '.start' to '.load') is a standard sideways ROM header and contains the code necessary for identifying 128 DFS commands and printing *HELP messages.

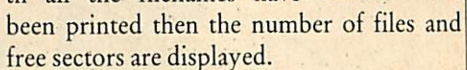
There are the four subroutines for loading a sector ('.load'), saving a sector ('.save'), loading a track ('.loadtrk') and saving a track ('.savetrk'). These four use the OSWORD call &7F to access the disc controller directly. Figure 3 details the use of this command. The subroutine ('.setblk') checks that the disc in drive 0 is a 128 DFS disc and returns an error if it isn't.

The next section contains all the data needed by the ROM; the legal commands, error messages and the *INIT data are all included here. The routine '.error' handles error output by copying the appropriate message onto the stack (&0100) and jumping to it. Then the operating system deals with it.



The rest of the ROM contains the code for the new star commands. This begins with *LOG.

*LOG ('.dir') reads a sector at a time from track 0 and if it is not empty displays the filenames plus their start addresses and lengths. This is repeated until all the filenames have



been printed then the number of files and free sectors are displayed.

*GET ('.get') uses '.findname' to see if the file specified exists and if it does, gets its start sector, start address and length. The file is then loaded. Loading one sector at a time is rather slow, so the program loads single sectors until it is possible to load whole tracks, this is repeated for as long as possible and then any left-over sectors are loaded individually. The code from '.found2' checks if the filename begins with '!' and if so sets PAGE accordingly.

Last eight bytes

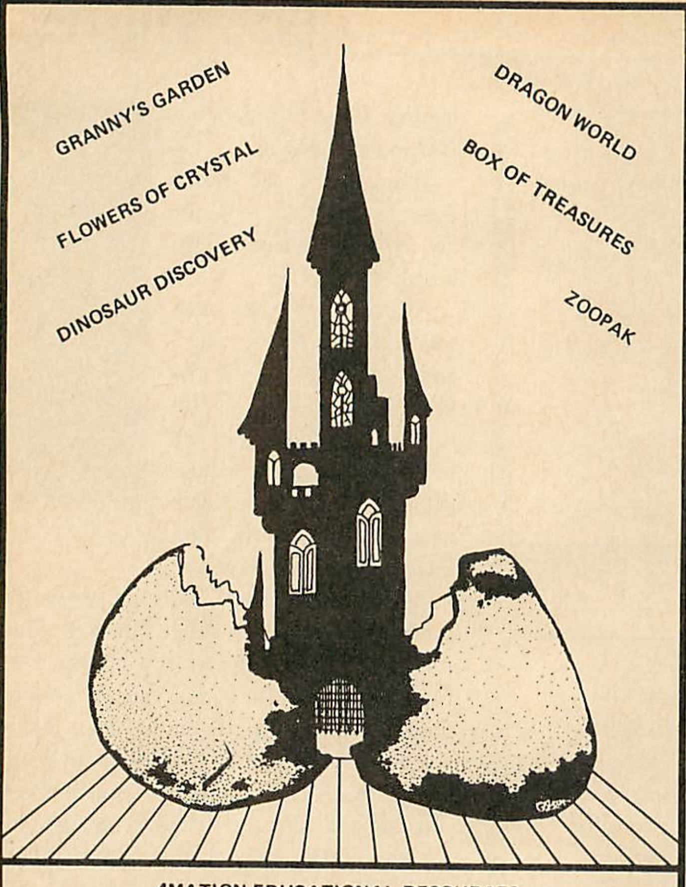
*INIT ('.init') reads the number of sectors on the disc from track 0 sector 1 and calls '.init40' or '.init80' as appropriate. Both of these routines save a file called '128 DFS' that takes up the whole of the disc. However, they save different information in the last eight bytes of track 0 sector 0. See figure 4. Both routines then fill the rest of track 0 with zeros (&00).

*ERASE ('.erase') finds the last file in the catalogue and displays it, asking if you're sure you want to erase it. If you are sure, the catalogue and the number of free sectors (track 0 sector 0) are updated. If no files exist, an error is caused.

Other routines used by the program are '.hex' and '.tohex' (just before '.put') that check for a valid hex number input and display a hex number respectively.

The program uses zero page locations &70 to &77, &80 to &89 and &8E. It would be possible to save the values in these locations when one of the commands was used and restore them after use, possibly using sideways RAM. Pages &9 and &A are also used as buffers.

There is a great deal of room for improvement in this program. For example, a means of easily saving Basic programs would be nice, as well as a way of erasing a specified program. If you would like to add to the basic programs yourself, feel free, if not, you'll have to wait for version 2!

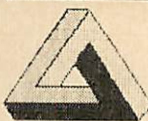


4MATION EDUCATIONAL RESOURCES

Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ
Telephone: (0271) 45566 Telex No: 42513 Sharet G. 4MAT

SEND A5 S.A.E. FOR CATALOGUE

TELEPHONE CALLS ON OR AFTER AUGUST 25TH



Camelot Computer Services

Camelot Computer Services,
14 South View,
Woodley, Stockport
Cheshire, SK6 1PD.
(061) 494 2253.

** NEW PRODUCT** **THE MENU** ** DISC BASED **

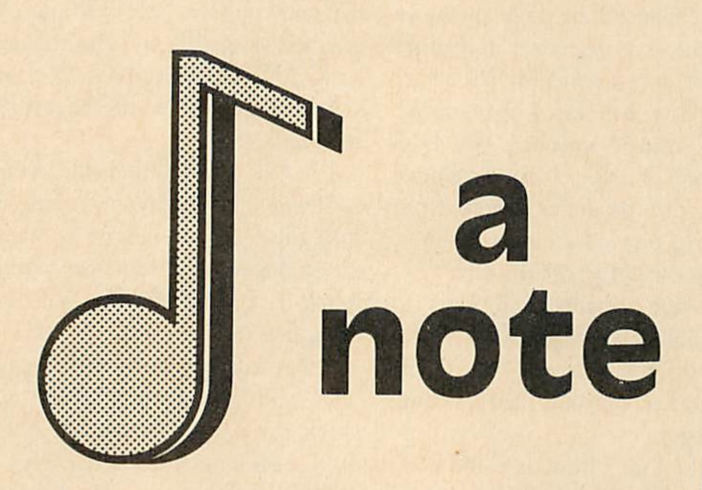
Two utilities in one. Resides only in the ! BOOT file on your discs.
Presents a user-friendly 'front end' to the disc and ROM systems.
Displays current date and time (Master Series only).
Compatible with the Model B, B+ and Master Series. 8271 or 1770 DFS.
Written in 100% Machine Code for speed and Mode 7 for the display.
On-screen instructions and error trapping.

Disc Menu: Reads both sides of disc and displays them on an up/down scrolling window. BASIC and Machine Code programs recognised automatically when loading. Handles multi-part programs with ease. Provides info on disc titles, *OPT settings, whether each file is locked or not and on which drive they are held.

Roms Menu: Displays up to sixteen ROM/RAM banks showing contents. Indicates which RAM banks are empty and whether they are write protected. Can save ROM images to disc, load ROM images from disc (into any sideways RAM bank) or execute any operating system call, e.g. *HELP.

THIS IS WHAT THE ! BOOT FILE WAS CREATED FOR.
EVERY DISC NEEDS 'THE MENU'.
BUY ONCE TO ADD TO ALL OF YOUR DISCS AND TAKE A 'LOAD' OFF YOUR MIND!!

ONLY £15.75 inc P&P **THE MENU** **State 40/80 track**



NOTE: THE MUSIC SYSTEM

- Is the most advanced micro based music program for the BBC microcomputer
- Is sophisticated, yet simple to use
- Features unparalleled create, edit, play and print tunes facilities
- Has a Song and Sound Library getting everyone off on the right note
- Even the Instruction Manual has been applauded
- IT IS MORE THAN JUST WORTH NOTING!
- BUY THE MUSIC SYSTEM TODAY

DISC PACK EDITOR · SYNTHESISER · KEYBOARD · LINKER · PRINTOUT · SONG AND SOUND LIBRARY · £29.95 INC VAT. PLEASE ADD £1.25 P&P PER ORDER. CASSETTE 1. KEYBOARD · SYNTHESISER · SOUND LIBRARY · £9.95 INC VAT. CASSETTE 2. EDITOR · PRINTOUT · SONG AND SOUND LIBRARY · £9.95 INC VAT. PLEASE ADD £1.25 P&P PER ORDER.

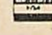
ADDITIONAL SONG LIBRARY DISC. 2 TOCCATA AND CAROLS · 3 400 YEARS OF MUSIC · 4 MAINLY BACH · 5 IAN WAUGH ORIGINALS · 6 OLD FAVOURITES · £4 EACH INC VAT · POSTAGE FREE

NOW WORKS ON BBC MASTER, B+ AND ALL DFS AND DDFS (INC. SOLIDISK AND WATFORD)

NEW UTILITIES DISC. KEYBOARD → MUSIC FILE CONVERTER · PLAY FROM BASIC UTILITY · TMS MUSIC FILE CONVERTER · MUSIC EDITOR FILE CONVERTER · £6 INC VAT · POSTAGE FREE

ECONET VERSION £89.70 INC VAT PLUS £1.25 POSTAGE. AMSTRAD AND COMMODORE 64 VERSIONS ALSO AVAILABLE

ORDERS TO: SYSTEM, DEPT. A,
12 COLLEGIATE CRESCENT, SHEFFIELD S10 2BA.

 (0742) 682321  *DEALER ENQUIRIES WELCOME.*



SYSTEM SOFTWARE



The System utility from KM Software Ltd

Extra commands for BBC B & Master users, Master features include CMOS editor, CHARSET to move the character set into private ram, PVIEW private ram editor.

For the BBC B user it implements the MASTER rom handlers (INSERT/UNPLUG etc), disabled roms stay off even over a CTRL+BREAK.

Plus commands which can be used by both BBC B & MASTER, GPACK (powerful screen packer), Very powerful dissasembler (6502, 65C12, I/O, tube, lables etc.), memory editors, Down loader creator, Bad Program recover, Mode designer, Tube editors, Formatter, Verifier etc.

Price £25.00

Also available KM'S Sound to Light converter, This chip contains 10 different screens with an amazing 63 colours and responds instantly to sound input to the cassette port. Just play your favourite music and watch the colours and patterns flow.

Price £12.50

Are you fed up with Zapping aliens why not try STRATAGEN a strategy game for two to four players using colourful graphics as pieces on a large 10 by 8 grid, with options to pass, abort and even cheat (if you can find it . . .)

5.25 inch disc (40/80 track format): £7.95

Tape: £4.95

Send orders to: KM Software Ltd., 39 Clos des Ormes, Rue Verte, St. Lawrence, Jersey C.I.

Klick

The flexible computer benching system



The Klick flexible benching system has been designed for constructing free standing benching which can be assembled quickly and easily. The Standard range is available in 3 heights and can be supplied with a selection of underbench storage units. The Flexi range provides the scope for any unusual size, height or configuration required. For product brochure and price list please contact:
Store Stock Systems Ltd, Claverton Road, off Floats Road, Wythenshawe, Manchester M23 9NE Telephone 061-998 9726

NEW



Minerva Systems bring you another World First!

SYSTEM GAMMA

Imagine, you want a graph of your sales, but you also want a pie chart, histogram and a scatter graph on the screen simultaneously - AND you want to put text labels on the screen, AND everything in a specific place. Well, now it's a reality!

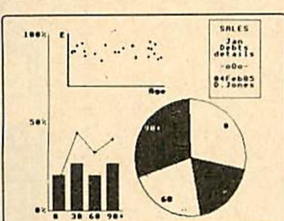
★ Completely definable - display multiple charts of varying types.

★ Place text or plot anywhere on the screen.

★ Statistics include standard deviation, line of best fit, etc.

Integrates fully with the System Delta range. Interfaces with BASIC.

AND, as you would expect, it is fully programmable for Users who require it.





SYSTEM DELTA

Still the most comprehensive & flexible Database System on the BBC.

The CARD INDEX program supplied with System Delta is simple to operate for everyone including a new User to the BBC, yet it's versatility and power are unrivalled. Office workers find it a pleasure to operate - just ask some of our business users - Rolls Royce, Range Rover, British Aerospace, ICI, CEGB, Smiths Instruments, Ciba-Geigy, British Gas, United Biscuits, British Telecom, British Museum or even the BBC themselves.

Reviewed as the simplest database to understand - now its even easier with our new issue manual.

Furthermore it is the only system on the BBC that links to a vast range of other programs including: Reporter, Mailshot, Inter/View Link, Invoicing, Sales, Purchase, Stock, Nominal, Video Rental, School Administrator, Hotelier, Newsagent......

MINERVA TAKE THE RISC

Watch this space for Minerva's new RISC based product range which take Databases/Graphics into the 21st Century. - Step into the Future with the wise Goddess Minerva.

MINERVA



MINERVA SYSTEMS
69 Sidwell Street, Exeter, Devon EX4 6PH
Telephone: 0392 37756

Please supply / Send details
System Delta with Card Index £64.95 System Gamma £45.95

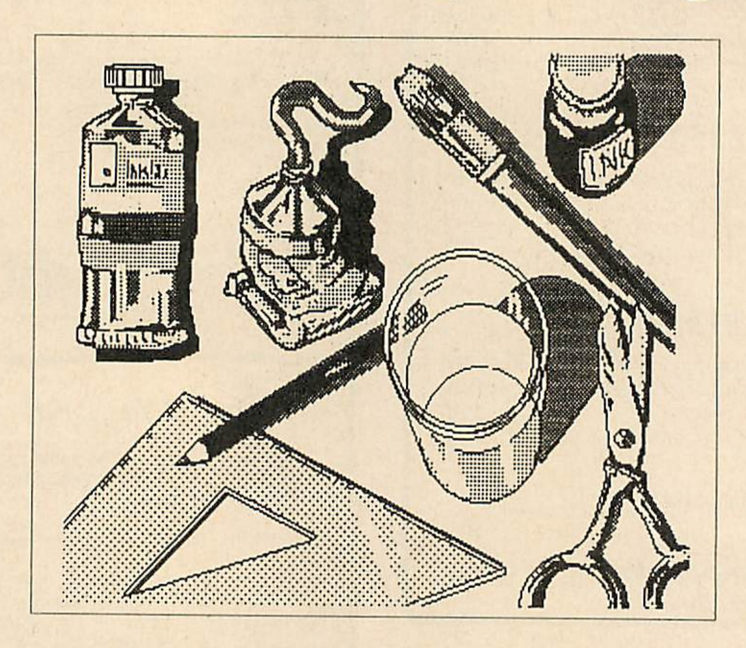
Chq/Access No.: ____________________

Name : ____________________

Address : ____________________
: ____________________
: ____________________
: ____________________

ACORN USER OFFER

A stroke of graphic genius!



'*Artroom* . . . the best there is': *Acorn User* (February 1987). The *Artroom* pack consists of *Artroom* and *ACE* (*Artroom Colour Extension*), an icon based full-screen package which can be controlled by mouse or keyboard. The disc also contains advanced printer dumps and a ready made graphics library which can be used as they are or altered to your needs. All the usual features are there including 'cut and paste' and the 'zoom' option.

ACE consists of two programs. *Colourizer* allows you to produce model colour versions of *Artroom* screens and to dump them to a printer using a shaded printer dump. The *Mode Converter* program will convert any graphics screens into a mode 4 *Artroom* screen ready for loading into *Artroom*. Conversions can be made from modes 0,1,2,5 and 7. YES 7!

Artroom and *ACE* will work with any mouse, but Digimouse is well engineered using a non-slip ball and optical encoders. Digimouse also includes the unique 'Linear Lock' facility that enables you to draw straight lines freehand. All this from as little as £25! *Artroom* is only available for the Master 128 and the Compact.

Please send me:

——— copies of *Artroom* + *ACE* for the Master at £25. SAVE £15.
——— copies of *Artroom* + *ACE* for the Compact at £29. SAVE £15.
——— copies of *Artroom* + *ACE* + Digimouse for the Master at £54.90. SAVE £20.
——— copies of *Artroom* + *ACE* + Digimouse for the Compact at £58.90. SAVE £20.

NAME ______________________________

ADDRESS ______________________________

______________________________ POSTCODE ______

☐ I enclose my cheque/postal order payable to Clares Micro Supplies for £ ______

Charge my Access A/c No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry Date ☐☐☐☐

SIGNED ______________ DATE ______________

Send this coupon with your remittance to *Artroom* Offer, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.

GET THE PICTURE

Smoothing, edge detection and editing by art package are all ways of processing digitised pictures. Here's how to sharpen your image

Phil Wilkes

A few months ago, I treated myself to a video digitiser. This clever device allows me to convert pictures from a video recorder into graphics screens on my BBC micro. Suddenly, I could produce pictures which would previously have taken hours of painstaking work with an art package – if indeed I were that gifted!

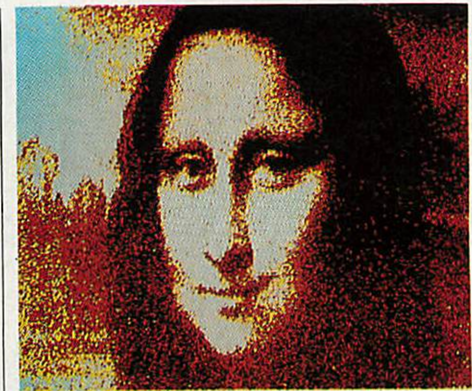
As a result, I soon had several discs full of digitised pictures. They are easy to produce and it doesn't take long! I digitised anything – the news, favourite television characters, wildlife programs, the test card . . .

After this initial burst of enthusiasm, I began to wonder what I could do with these pictures. Most looked OK on their own, and they could be displayed as a sequence by writing a simple program which loaded each in turn, allowing suitable delay between them. After a while, I soon realised that a little processing could turn an average screen into a more impressive one.

Editing

Most art packages save pictures by just saving the screen memory. It is therefore a simple matter to transfer a digitised picture into an art package for editing via mouse, joystick, graphics tablet or keyboard. I recommend *AMX SuperArt*, if you have it, and *Acorn User*'s own *Freehand* program published in October and November 1985. The latter is very strong on treatments of existing images, and is one of the best packages I have found for editing and manipulating digitised pictures.

One of the easiest treatments I have found is just to erase all the background detail to allow the main subject to stand out against a black or white background. And it can be fun to add speech balloons to people, making instant cartoons! However, not everyone has an art package, or feels confident enough to do the freehand drawing usually required. So I looked at creating some programs which would automatically process entire screens, to achieve different effects from an original digitised picture. These routines are presented in this article. Don't think that you need a digitiser to perform these routines either. Although intended for use with digitised pictures, some of the programs work equally well with any graphics screen.



An image requiring vertical compression

Something that needed doing to virtually all pictures was correction of the aspect ratio. My digitiser, and most others on the market, produces pictures which are slightly too tall relative to their width. This can be corrected with listing 1 in the yellow pages, which applies a vertical compression to the picture by a factor of 1/1.2. This value may be changed to match your equipment or for special effects.

It works by copying complete horizontal lines, but skips some to give the compression effect. This leaves a blank area at the bottom of the screen. The line copying is done by directly accessing screen memory for speed, so listing 2 on the yellow pages gives a 'legal' version which should work on second processors or with shadow screen memory, albeit at a more leisurely pace.

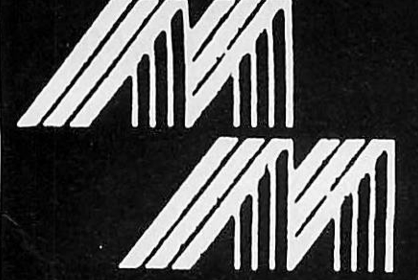
One of the problems with digitised pictures is that the digitiser samples an analogue signal and converts it to a limited range of digital values. If part of a picture is mid-way between two levels, a grainy effect is produced – I'm sure you must have seen this. Also, areas which should just be one colour can be broken by single pixels of a different colour, often because of interference or 'noise' in the video system. The second process I looked at was therefore to smooth the picture, an effect giving a more even appearance.

Smoothing

This effect is achieved by looking at each 2×2 block of pixels and averaging the brightness of the colours, plotting the resultant colour in the bottom left-hand corner. By doing this for every 2×2 block on the screen, the whole picture is smoothed, and single isolated pixels are removed. The process can then be repeated to give an even smoother effect if desired.

The small block size of 2×2 was used in order to avoid too much loss of detail, although some 'smearing' is inevitable. A Basic program to smooth the screen in this way ran very slowly, taking about half an hour to process one screen. Listing 3 on page 118 in the yellow pages is a machine code version. This takes only a couple of minutes to run, and should work on any BBC B, Master or Electron micro.

While I was doing this, I thought of another way in which a 2×2 block could be analysed. This led to yet another process – edge detection. When the bottom left-hand corner pixel in a 2×2 group is compared to the other three, if the difference between any of them is greater than a given threshold



M & M COMPUTERS

Bon-Accord House
41 Albert Street, Aberdeen AB1 1XU
Tel: 0224-571735
Telex 739916
Incorporating MICROBANK LTD
031 331 1716

ARCHIMEDES SOFTWARE NOW AVAILABLE



COMPACT SOFTWARE

GAMES/ADVENTURES	R.R.P.
BBC PUBLICATIONS	
White Knight	£14.95
BLUE RIBBON	
Games Disc I	£12.95
Games Disc II	£12.95
CDS	
Birdie Barrage Golf	£12.95
Steve Davis Snooker	£12.95
MICRO POWER	
Dr Who and the Mines of Terror	£9.95
Micro Power Magic	£9.95
SQUIRREL	
Games Disc	£14.95
SUPERIOR	
Revs/4 Tracks	£19.95
Elite	£19.95
Repton III	£14.95
Galaforce	£14.95
Karate Combat	£14.95
Repton 2	£14.95
Strykers Run	£14.95
Speech	£14.95
Citadel	£14.95
Acornsoft Hits Volume I	£14.95
Acornsoft Hits Volume II	£14.95
Codename Droid	£14.95
Around the world in 40 screens disc	£9.95
TYNESOFT	
Big K.O.	£12.95
Goal	£11.95
Jet Set Willy II	£12.95
Commonwealth Games	£11.95
Mousetrap	£11.95
US Drag Racing	£11.95
Vindaloo	£11.95
Winter Olympics	£11.95
EDUCATIONAL	
A.S.K.	£22.95
Best Four Maths	£22.95
Best Four Language	£22.95
BBC PUBLICATIONS	
Figures of Fun	£18.95
HIGHLIGHT	
Comp I	£19.95
Comp II	£19.95
Superior Collection 1	£14.95
Superior Collection 2	£19.95
Grand Prix Construction Kit	£14.95

ELECTRON SOFTWARE

GAMES/ADVENTURES		
MICRO POWER		
Micro Power Magic		£7.95
Ghouls	S/O	£7.95
Swag	S/O	£6.95
Felix Meets Evil Weevils	S/O	£6.95
Killer Gorilla	S/O	£7.95
Felix in the Factory	S/O	£7.95
Moonraider	S/O	£7.95
Adventure	S/O	£7.95
Galactic Commander	S/O	£7.95
Bumble Bee	S/O	£6.95
Chess	S/O	£7.95
Croaker	S/O	£7.95
Cybertron Mission	S/O	£7.95
Danger UXB	S/O	£7.95
Electron Invaders	S/O	£7.95
Escape Moonbase Alpha	S/O	£7.95
Frenzy	S/O	£6.95
Felix & Fruit Monsters	S/O	£7.95
Gauntlet	S/O	£6.95
SUPERIOR SOFTWARE		
Elite		£12.95
Acornsoft Hits I		£9.95
Acornsoft Hits II		£9.95
Ravenskull		£9.95
Repton III		£9.95
Thrust BBC/Electron		£7.95
Karate Combat BBC/Electron		£8.95
Citadel		£9.95
Repton II		£9.95
Galaforce		£9.95
Around the world in 40 screens cassette		£6.95
TYNESOFT		
Ian Botham Cricket BBC/Ele		£7.95
Big K.O. BBC/Electron		£7.95
Jet Set Willy II BBC/Ele		£7.95
Future Shock BBC/Ele		£7.95
Goal BBC/Ele		£7.95
Winter Olympics BBC/Ele		£6.95
U.S. GOLD		
Impossible Mission BBC/Ele		£9.95
Questprobe		£7.95

WE ALSO STOCK ALL ACORN HARDWARE

BBC SOFTWARE

GAMES/ADVENTURES		
Dr Who and the Mines of Terror Master B+		£9.95
Micro Power Magic 40 Track		£7.95
Micro Power Magic 80 Track		£7.95
Micro Power Magic		
Dr Who and the Mines of Terror (16K Rom + Cassette)		£8.95
Dr Who and the Mines of Terror (16K Rom + Disc)		£9.95
Castle Quest Disc		£7.95
Castle Quest Cassette		£6.95
Star Fleet Encounter		£9.95
ACORNSOFT		
4-Tracks		£9.95
Magic Mushrooms		£12.95
Boxer		£9.95
Bouncer		£9.95
Complete Cocktail Maker		£9.95
Snooker		£9.95
Terrapod	S/O	£9.95
Drogna	S/O	£9.95
Aviator		£14.95
ACORNSOFT Disc		
Snooker		£11.50
Magic Mushrooms		£14.95
4-Tracks Disc		£12.65
Aviator		£17.65
ARCANA		
View Professional		£113.95
Master Overview		£98.90
Powerplay Disc		£14.95
AUDIOGENIC		
Thunder Struck BBC/Ele		£7.95
Thunder Struck Disc		£11.95
Power pack		£9.95
The Last of Free BBC/Ele		£7.95
Pycastria Disc		£11.95
Pycastria BBC/Electron		£7.95
International Megasports/Genesis Project		£8.95
Complete BBC		£19.95
BBC PUBLICATIONS		
White Knight MK12 Disc		£18.95
White Knight MK12		££9.95
Able to transfer to disc		
Maths with a Story I Disc		£10.95
Battlefieds (Cassette)		£9.95
Picture Craft (Disc)		£17.34
Modem Master		£12.95
SUPERIOR		
Around the world in 40 screens disc		£7.95
Acornsoft Hits I		£9.95
Acornsoft Hits I Disc		£1.95
Acornsoft Hits II		£11.95
Acornsoft Hits II Disc		£11.95
Elite Disc		£14.95
Revs/4 Tracks		£12.95
Revs/4 Tracks		£14.95
Elite		£12.95
Ravenskull		£9.95
Ravenskull Disc		£11.95
Repton III		£9.95
Repton III Disc		£11.95
Strykers Run		£9.95
Strykers Run Disc		£11.95
Thrust Disc		£11.95
Thrust BBC/Electron		£7.95
Superior Collection Vol 1		£11.95
Superior Collection Vol 2		£11.95
Grand Prix Construction Kit		£11.95
Karate Combat Disc		£11.95
Karate Combat BBC/Electron		£8.95
Citadel		£9.95
Citadel Disc		£11.95
Repton II		£9.95
Repton II Disc		£11.95
Galaforce		£9.95
Galaforce Disc		£11.95
Codename Droid Disc		£11.95
Codename Droid Cass		£9.95
TYNESOFT		
Big K.O. BBC/Electron		£7.95
Big K.O. Disc		£12.95
Winter Olympics Disc		£12.95
Future Shock Disc		£12.95
Goal Disc		£12.95
Ian Botham Cricket Disc		£12.95
Commonwealth Games Disc		£12.95
Jet Set Willy II Disc		£12.95
Jet Set Willy II BBC/Ele		£7.95
Future Schock BBC/Ele		£7.95
Goal BBC/Ele		£7.95
Ian Botham Cricket BBC/Ele		£7.95
Jet Set Willy BBC/Elec		£7.95
Winter Olympics BBC/Elec		£6.95
U.S. GOLD		
Impossible Mission Disc		£14.95
Impossible Mission		£9.95
Raid Over Moscow		£9.95

Rebel Planet		£9.95
Questprobe		£7.95
Bounty Bob		£9.95
Tapper		£9.95
ULTIMATE		
Cosmic Battlezones		£9.95
BEAU JOLLY		
Five Star Games 'B'		£9.95
Computer Hits III		£9.95
Computer Hits 2 Disc		£14.95
Computer Hits 2		£9.95
Computer Hits 10 games		£9.95
BUG-BYTE		
Plan B		£2.99
Dunjunz		£2.99
Skyhawk BBC/Ele		£2.99
Star Force Seven		£2.99
Roboto		£2.95
Twin Kingdom Valley		£2.95
Jack Attac		£2.95
Savage Pond		£2.95
CDS		
Brian Clough's Football Fortunes		£14.95
BRain Clough's Football Fortunes		£17.95
Colossus 4 Chess BBC/Ele		£9.95
Colossus 4 Chess Disc		£14.95
DESIGN PEOPLE SOFTWARE		
Tanks Disc		£12.95
Sink the Bismark Disc		£10.99
DOCTOR SOFT		
Double Pantom disc		£19.95
Phantom Combat Disc		£12.95
Phantom Combat		£9.95
DOMARK		
Young Players Full Edition Trivial Pursuit disc		£19.95
Young Players Question Pack (Trivial Pursuit)		£7.95
Trivial Pursuit		£14.95
ELITE		
Commando		£9.95
Air Wolf		£9.95
Air Wolf Disc		£14.95
FIREBIRD		
The Sentinel		£9.95
The Sentinel Disc		£14.95
GREMLIN		
Footballer of the Year		£9.95
Footballer of the Year Disc		£14.95
IMAGINE		
Yie Ar Kung Fu		£8.95
Yie Ar Kung Fu Disc		£12.95
LEISURE GENIUS		
Monopoly Disc		£14.95
Scrabble		£12.95
Scrabble Disc		£14.95
MACSEN		
Blockbusters BBC/Ele		£7.95
MARTECH		
W.A.R.		£8.95
W.A.R. Disc		£14.95
Samantha Fox Disc		£12.95
MELBOURNE HOUSE		
The Hobbit		£9.95
Lord of the Rings		£15.95
Way of the Exploding Fist		£9.95
Way of the Exploding Fist Disc		£14.95
MIRRORSOFT		
Strike Force Harrier		£9.95
Strike Force Harrier Disc		£12.95
Hi-Bouncer	S/O	£6.95
MOSAIC/LEVEL 9		
The Secret Diary of Adrian Mole Disc		£12.95
OCEAN		
Daley Thompson Supertest D		£14.95
Yie Ar Kung Fu II		£8.95
BUSINESS SOFTWARE (MASTER)		
Guest Sense (Guest House & Hotel package)		£172.50
Fix Sense (Fixed Asset package)		£172.50
Per Sense (Personnel package)		£172.50

Also available for IBM, Amstrad & Apricot equipment.

H S SOFTWARE

READ-RIGHT AWAY	
Reading Pack 1. Age 5-8 years For the BBC Model B Disc	£11.95
ADVENTUROUS ENGLISH	
English Grammar & Language Skills Age 7-11 years Disc	£7.95
CROSSWORDS	
Range 8 years to adults For the BBC/Electron Disc	£7.95
ENTERTAINING ENGLISH	
English Language Skills Age 7-11 years for the BBC 'B' Disc	£11.95

POSTAGE & PACKING ON SOFTWARE

All prices include VAT at 15%
For Software add £1 for outside Scotland, and 50p within Scotland, for orders over 6 games post & packing is FREE.

E.O.+E.

Mail Order

To: M&M COMPUTERS, Bon-Accord House, 41 Albert Street Aberdeen AB1 1XU
Please send me ______________________

☐ I enclose a cheque for £............ payable to M&M COMPUTERS.
☐ Please debit my Access/Visa Account





No______________ Signed______________
Name______________ Address______________

a black point is plotted, otherwise a white point is plotted. This gives a picture in which the edges between areas of different colours are drawn in black on an otherwise white background. This reduces any picture to a line drawing, which can then be coloured or printed as required. The threshold level is adjustable, so that all boundaries are detected, or only the most significant ones. A little experimentation is usually required to find the best value for a given picture, although once you have used the effect a few times it becomes easier to guess a good value to use.

How to use the programs

Both edge detection and smoothing are coded into listing 3, which produces a piece of machine code which is saved to disc in a file called O.EFFECT. For ADFS users, directory 'O' has to be created before running listing 3. Listing 4 is a demonstration showing how to use the assembled code. It includes the procedure PROCeffect (M%,E%,T%), which is all that is needed in your own programs. Both edge detection and smoothing are demonstrated in this program – the M%,E% and T% parameters are explained below.

PROCeffect takes three parameters which it passes unchanged to the code. These are:

M%: The current mode, which may be 0, 1 or 2;

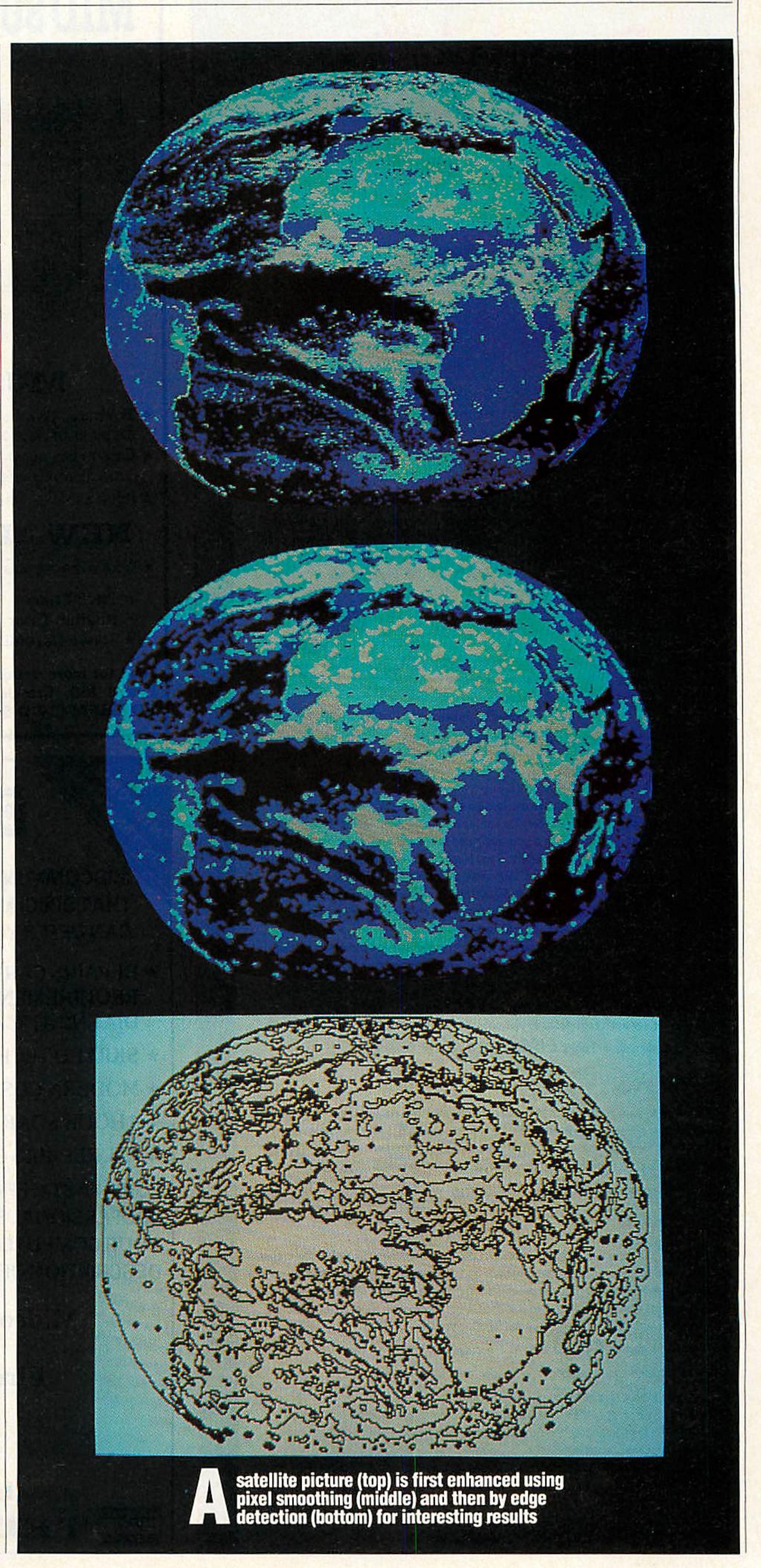
E%: The effect required:
= 1 for edge detection
= 2 for pixel averaging;

T%: Meaning depends on the effect called:
if E%=1, % is the lowest difference to trigger the edge detection. T%=1 will give all edges;
if E%=2, T%=0 will round averages down,
T%=1 will round averages up.

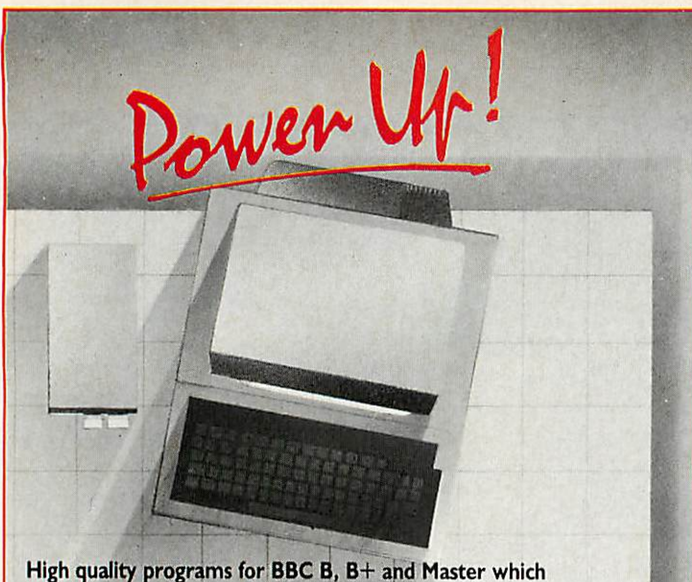
For example: PROCeffect (1, 1, 2) would give edge detection for a mode 1 picture with a threshold value of two. In other words, if adjacent areas are colours 0 and 2, 1 and 3 or 0 and 3, a black line would be drawn where they meet. If the colours of adjacent areas were only separated by one (eg, 1 and 2), no line would be drawn.

Alternatively, PROCeffect (2, 2, 1) would give pixel averaging (picture smoothing) for a mode 2 picture, with averages rounded up if needed.

The effects can sometimes be used in conjunction, first to smooth a picture and then use the edge detection, for the best



A satellite picture (top) is first enhanced using pixel smoothing (middle) and then by edge detection (bottom) for interesting results



High quality programs for BBC B, B+ and Master which immeasurably increase the practical power of your computer in home, education and laboratory.

Overlay Basic

At last, an effective, totally transparent overlay system for BBC BASIC which is simplicity itself to use. You need never again run out of memory when programming and you can easily incorporate your favourite procedures in programs time and time again. Overlay BASIC offers a series of new BASIC commands enabling you to create a library of subroutines. These subroutines will be automatically called in from disk, used and 'forgotten' whenever referred to by your program. A program which once occupied 64K RAM may now only need 5K. Run-time facility enables you to distribute programs with overlays on disks which work without a chip.*

. . . one of those neat ideas whose simplicity of use hides a major problem-buster . . . has opened up a new age for the keen programmer . . . a touch of genius . . .

ViewFax Tubelink

**Floppy or hard*

ROM + disk + documentation ***£29.95*** *inc. VAT and postage*

SoftOscilloscope

A powerful emulation of the storage oscilloscope enabling fast real-time collection and analysis of data from many sources. You can input data at up to 100 Hz through the games paddle port. SoftOscilloscope is also configured to run with Unilab, Griffin and George, Philip Harris, Oasis and 3D A/D converters. If you purchase the Professional version, you can configure it to run with other converters. With more sophisticated converters, SoftOscilloscope can process data at up to 50,000 Hz. To exploit all the features of SoftOscilloscope, a printed circuit board is provided free to each purchaser, enabling construction of a sophisticated A/D converter at negligible cost.

SoftOscilloscope is fully menu-driven and has features comparable to instruments costing many hundreds of pounds. It can be used for professional data processing encountered in biological research (nerve potentials, etc.), engineering, etc.

Education version: *ROM + disk + manual* ***£49.95*** *inc. VAT & postage*

Professional version: *extra features plus open access for customising to your own needs: 2 ROMs + 2 manuals + 3 disks* ***£199*** *inc. VAT & postage.*

SoftServo

Control up to eight electro-mechanical servo motors with this easy-to-use package—needs no hardware interface. Servos are cheap and freely available so now you can complete the cybernetic feedback loop. Control equipment, create robots or just switch on the lights when it gets dark. Manual and demo disk incorporate lots of practical ideas.

ROM + disk + manual ***£49.95*** *inc. VAT & postage*

SoftChart

*Use your Epson-compatible printer to produce multi-channel continuous graphical output from your computer. Gives better resolution and speed than screen-dumping—the print-head follows your signal and does not sweep from side to side. Use *CHART command from BASIC programs to plot data or use the SoftChart Recorder program supplied, to emulate a four-channel chart recorder. Tick marks and labelling possible.*
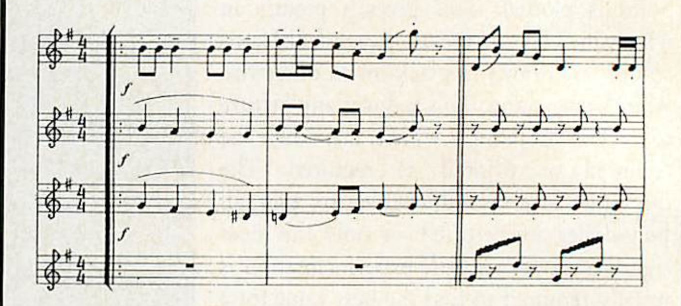
ROM + disk + manual ***£49.95*** *inc. VAT & postage*

Payment from individuals must accompany order, and may be made by:

1. Cheque: made out to 'Elsevier' in pounds sterling.
2. Credit card: we accept AmEx, Visa and Access. Please give card number, expiry date, issuing bank (if appropriate), the cardholder's name and address and signature.
Institutional purchase orders acceptable.

Elsevier - BIOSOFT
68 Hills Road, Cambridge, CB2 1LA, UK
Telephone: 0223-68622 Telex 81623

MID SUSSEX SOFTWARE



MUSIC PRINTING

★ The music processor from Mid Sussex Software produces printed music to professional standards.
★ Easy music entry for single parts or scores, editing, transposition, extraction of parts from scores, playback.
★ Price £49.95 – State 40/80 Track, BBC B or Master.

NEW MUSIC PROGRAMS

★ Three new programs for use in music education – available in September

★ Pitch Trainer
★ Rhythm Tutor
★ Listen Carefully

£9.95 each
State 40/80 Track

Send for more details to:- Mid Sussex Software, 11 Bridle Way, Pound Hill, Crawley, West Sussex RH10 4HP or telephone HORSHAM (0403) 54922.

MIDCOMM INTERNATIONAL

COMPUTER REPAIRS

MIDCOMM INTERNATIONAL LTD IS A COMPANY THAT SPECIALISES IN COMPUTER REPAIRS AND CAN OFFER YOU THE FOLLOWING 5 STAR SERVICE:-

★ REPAIRS CARRIED OUT TO MANUFACTURERS REQUIREMENTS USING THE MOST UP TO DATE DIAGNOSTIC AND TEST EQUIPMENT AVAILABLE.
★ SKILLED TECHNICAL STAFF.
★ MODERN CUSTOMIZED WORKSHOPS.
★ 4 HOUR SOAK TEST ON EACH REPAIR.
★ ALL REPAIRS GUARANTEED.

FOR A FAST, EFFICIENT, RELIABLE AND PROFESSIONAL SERVICE, CALL WITH OR SEND YOUR COMPUTER, TOGETHER WITH A BRIEF DESCRIPTION OF FAULT TO:-

Midcomm International Ltd
Unit F
Birch Industrial Estate
Whittle Lane
Birch
Heywood
Lancs OL10 2RB.



TEL 0706 625166



TABLE 1: ASSEMBLER ROUTINES

Name	Line No	Description
entry	300	Entry point where code is first called
gcol	890	Sets graphics colour to accumulator
brightness	990	Sets up tables relating logical colour to brightness
firstline	1440	Stores brightnesses from bottom line in table
testpoint	1740	Returns brightness of pixel in accumulator
process	1830	Main processing of screen including X and Y loops
plot	2510	Plots one pixel
edge	2750	If edge in block, sets GCOL to 0 else sets GCOL to 7
pixav	2960	Calculate average brightness of block and set gcol

TABLE 2: ZERO PAGE LOCATIONS

Address	Variable	Description
&70	xpoint	X co-ordinate of the pixel to be read
&72	ypoint	Y co-ordinate of the pixel to be read
&74	point	Logical colour of pixel
&75	arraypoint	Pointer into table storing brightnesses
&77	p0	Brightness of bottom-left corner
&78	p1	Brightness of top-left corner
&79	p2	Brightness of bottom-right corner
&7A	p3	Brightness of top-right corner
&7B	mode	Current mode as passed to routine
&7C	effect	Which effect was requested
&7D	threshold	Calculated threshold value
&7E	step	Size of pixel in X direction
&b0-&B7	bright	Brightnesses for given logical colours
&B8-&BF	logic	Logical colours for given brightnesses

results. Even further variation can be achieved by also using my mode changing software published in *Acorn User* in October 1986. For example, a mode 2 original could be converted to mode 1, pixel averaging applied and then edge detection. You can see from the illustrations how several different versions of the same picture can be produced, without ever using an art package. And with even limited use of one of these, the variations become limitless.

Line drawings

Non-digitised pictures can also be processed in a similar manner. The most effective treatment is the edge detection which can reduce any picture to a line drawing. This produces very good print-outs if you have a printer which does not handle shading patterns very well.

The main subroutines in listing 3 on the yellow pages are detailed in table 1 and the zero page locations used are listed in table 2.

The first action that takes place once the code has been called is saving the parameters passed to it for use later. The correct threshold values and step size for the given mode are then calculated. Two tables are set up which give conversion factors between logical colours and their respective brightnesses, and vice versa.

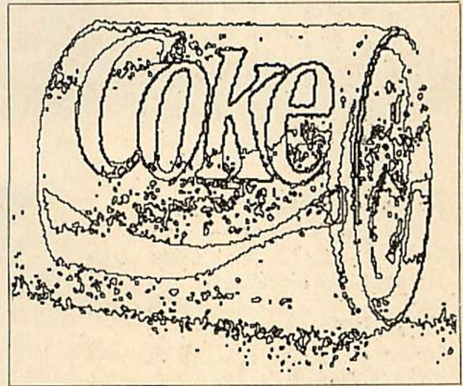
Processing of the screen is done from bottom to top and from left to right. Each pixel (except those at the screen edges) is considered four times as part of the four different blocks of 2×2 pixels which overlap it. Two of these occur consecutively as it forms first the top right and the top left of a block. The brightness value of this pixel is then saved to a block of memory which always records the previously processed line. This saves having to re-read the screen and considerably speeds the program up in the process.

Colour calculation

The bottom screen line is first read into this block of memory, and then each line is processed in turn, calculating the colour to be plotted as described above for each 2×2 block and then plotting each successive pixel on the screen.

When this calculation is complete, the top and right-hand edges are the only ones not to have been processed, as they cannot form the bottom half of a block. This is tidied up by drawing a line over these edges, in black for pixel averaging and in white for edge detection.

The program as it stands resides from &1400 to &15FF in memory, with the



Digitised picture enhanced by edge detection

memory block for storing the previous brightness values going from &1600 to &1800. PAGE is normally set to &1900 on a disc system and the code and data are safe provided that no data files are opened, as will usually be the case. Normal loading and saving is not affected.

Amendments

For tape systems, ADFS and Master users, these locations are not usually available. It is therefore recommended that PAGE is raised by &500 before using the routines, and lines 220 and 270 of listing 3 amended appropriately.

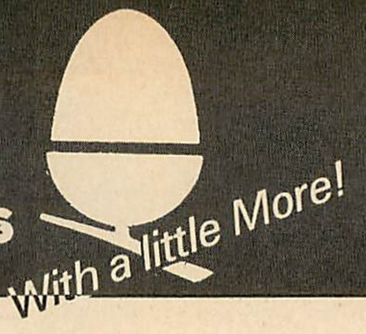
For example, on a standard BBC micro using the tape system, PAGE is normally &E00. This can be shown by typing PRINT-PAGE. The memory block address bx can be found by typing PRINT-PAGE + &200. This gives the answer '1000'. So now you can add the following lines to listing 3:

```
200 bx = &1000
250 P% = &E00
```

Before running your own program or listing 4, PAGE has to be raised by &500, by typing: PAGE = PAGE + &500. The call to the machine code in PROCeffect should also be changed to the start of the machine code, which is at the original value of PAGE, &E00.

These smoothing and edge-detection algorithms have a lot in common with the sort of techniques used to 'enhance' satellite photographs like those taken by Landsat or Meteosat. These photographs are transmitted to earth and processed digitally, and the aim of 'enhancement' is to make it easier to see minor features or changes here on the ground. Edge detection is used to pick out boundaries between, say, different types of vegetation on such photographs.

By using these programs together with a digitiser and an art package, you can produce images to enliven your programs or even stand in their own right.



SOLIDISK

Open hours:
Shop and showroom:
Monday to Saturday, 9.30am to 5.30pm.
Mail order and Services:
Monday to Friday, 8.30am to 5.30pm

ARCHIMEDES:

A-305 basic with 0.5MB of RAM .... **£799** + VAT
A-310 basic with 1.0 MB of RAM .... **£875** + VAT
A-305 model 3 with 1.5 MB of RAM .... **£919** + VAT
A-305 model 4 with 2.0 MB of RAM .... **£1039** + VAT
A-305 model 5 with 2.5 MB of RAM .... **£1045** + VAT
A-305 model 6 with 4.0 MB of RAM .... **£1245** + VAT



WITH 1.5 MB OF RAM!

Complete **ARCHIMEDES** 305 systems with a unique choice of RAM size, disc drives and monitor to fit your requirements.
— 6 possible RAM sizes: from 0.5 MB to 4 MB.
— 3 possible disc drive systems: single 3.5", twin 3.5" or one 3.5" and one 5.25" drives.
— 3 monitors: 12" green, 14" Acorn colour or 14" NEC Multisync high resolution colour monitor.
The Archimedes A-305 is a big feature micro with a huge potential. Our package prices for any complete Archimedes system (computer, drive and monitor) are the best around. The picture on the left shows a typical system comprising the A-305 upgraded to 1.5 MB of RAM, 3.5" drive, Acorn 14" colour monitor, mouse and free software. Price: only **£1,086 + VAT (£1,249 inclusive).**
Data sheets on the Architedes range are available on request.

It's Easy To Masterise Your Beeb

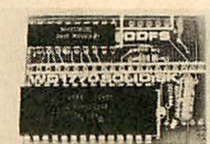
With Solidisk Add-Ons!

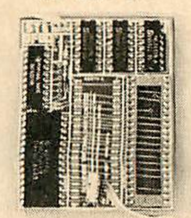
The Master wins over the BEEB on the provision of the Advanced Disc Filing System (ADFS), a Real Time clock, more memory and two internal co-processors.
Your BEEB can now gain those features and even beat the MASTER on the same ground with Solidisk add-ons. They are intelligently designed to use a minimum number of components, to occupy a minimum space inside the BEEB, to work together and with Acorn peripherals.
We work hard to keep prices low, so that it's much cheaper to upgrade your BEEB than exchanging it for a MASTER. As your BEEB retains its original features (such as an 8271), it can run more software too!

If you want to know more, Ask for the data sheets!

WD-1770 DFS:

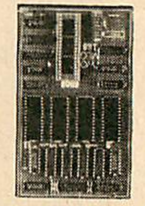
The new Acorn Disc Filing Systems DFS and ADFS require both the WD-1770 chip. Solidisk offers two basic WD-1770 models which are totally compatible with the Acorn DFS/ADFS ROMs. We also offer our own DFS 2.2 and ADFS 2.1 ROMs which have a superset of utilities and commands. Data sheets on these ROMs are available on request.
1) WD-1770 DUAL DENSITY DISC INTERFACE for previously tape based BEEB. This is the standard Acorn disc upgrade since 1985. Prices are:
WD-1770 DDFS without DFS ROM .... **£35.00 inc.**
WD-1770 DDFS with DFS 2.2 ROM .... **£45.00 inc.**
WD-1770 DDFS with ADFS 2.1 ROM set .... **£55.00 inc.**
Data sheet available on request.
2) WD-1770+8271 (DFDC) DISC INTERFACE: for BEEB already equipped with the 8271. This system allows you to keep the existing 8271 disc interface while adding the new WD-1770 chip. It has a simple switch to allow changing between the 8271 and the WD-1770. To operate the hardware, you will need either the latest ROMs from Acorn (8271 DNFS 1.2, 1770 DNFS and 1770 ADFS) or Soidisk ROMs. If you are stuck with old or inappropriate DFS software, buy the inexpensive DFS 2.2 ROM. Prices are:
DFDC without DFS ROM .... **£45.00 inc.**
DFDC with DFS 2.2 ROM .... **£50.00 inc.**
DFDC with ADFS 2.1 ROM set .... **£55.00 inc.**
DFDC with 2.2 and 2.1 set (3 ROMs) .... **£63.00 inc.**
Data sheet available on request.


WD-1770 DFS


WD-1770 + 8271

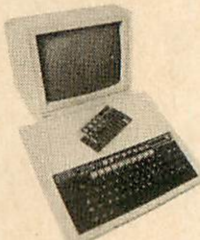
SOLIDISK TWOMEG 128K:

The new style TWOMEG 128K memory combines Sideways RAM, four EPROM sockets and Shadow RAM on a single board, running at the same 2MHz speed at the BEEB. As you can imagine from the picture, it's unobstrusive and very easy to fit, just drop in and go. It's the ideal memory upgrade for all BEEBs. With plenty of ROM sockets (4 on the motherboard and 4 on the TWOMEG board) and 128K of additional RAM, it beats the MASTER hands down. We supply five software discs to support this excellent product. Price **£60.00 inc.**


TWO MEG 128

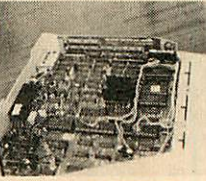
SOLIDISK FOURMEG 32K UP TO 256K:

SPEED, Sideways RAM, shadow RAM and 4 or 5 H/C ROM sockets are combined on the features laden Solidisk FOURMEG series. All FOURMEG boards have a 4MHz GTE 65C02 CPU as standard, same as on the Acorn TURBO co-processor. The new CPU can run BASIC 4 (and many other languages) at twice the speed of the MASTER or the COMPACT.
Its performance is comparable to a MASTER fitted with the TURBO board (costing a great deal more). New reduced prices:
FOURMEG 32K, 32K RAM, 5 H/C ROM sockets, software support on disc .... **£60.00 inc.**
Additional 32K RAM chip, optional, each .... **£15.00 inc.**
FOURMEG 256K, 256K RAM, 4 H/C ROM sockets, software support on disc, new low price **£100.00 inc.**
Software support disc, volumes 2 to 15, each .... **£2.00 inc.**
Please specify 40 or 80 track disc formats.
Data sheet available on request.


REDUCED!

SOLIDISK REAL TIME CLOCK:

The Real Time Clock can be plugged into any ROM socket on the BEEB motherboard with absolutely no wire attached. The Real Time Clock provides battery-backed TIME function (even usable with BASIC 4) and *CONFIGURE. Price **£29.00 inc.**
Data sheet available on request.

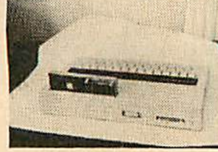

SPECIAL OFFERS!

SIDEWAYS-RAM BOARDS:

Sideways RAM can be used to load ROM images into the BEEB, make a printer buffer, store data and programs etc. Sideways RAM are additional memory to the basic 32K of the BEEB. To date, more than 50,000 BEEBs have been fitted with Solidisk Sideways RAM.
SWR32, 32K Sideways RAM + software disc No 1 .... **£20.00 inc.**
SWR64, 64K Sideways RAM, two H/C EPROM sockets + software disc No 1 .... **£30.00 inc.**
96K extension to SWR32 .... **£25.00 inc.**
SWR128 new style, 128K Sideways RAM, 2 H/C EPROM sockets + software disc No 1 .... **£45.00 inc.**
Software discs from 2 to 15, each .... **£2.00 inc.**
Please specify 40 or 80 track disc format.
Data sheet available on request.

ELECTRON EFS: LAST FEW!

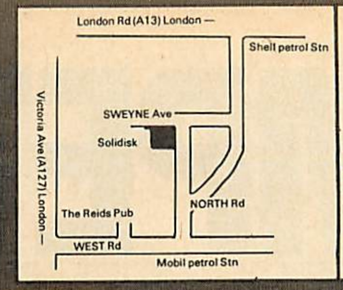
This excellent product combines a disc interface with DFS and ADFS, Solidisk Winchester port and 16K Sideways RAM. Price **£50.00 inc.**

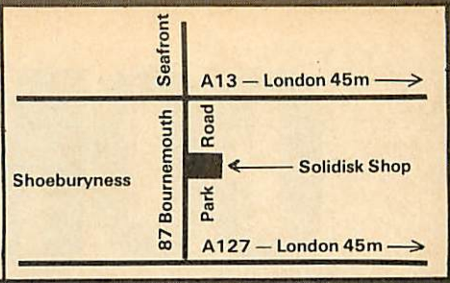

LAST FEW!

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVENUE, SOUTHEND

Address:
Shop and showroom:
87 Bournemouth Park Road,
Southend.
Mail order and Services:
17 Sweyne Avenue,
Southend SS2 6JQ

Telephone:
Shop and showroom:
Southend (0702) 616 818
Mail order:
Southend (0702) 354 674
Technical Services:
(0702) 43 11 22





MASTER:

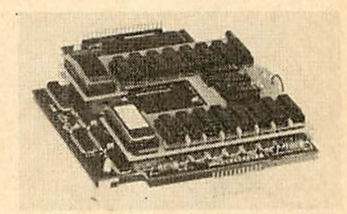
Our typical MASTER systems comprise the MASTER with 128K RAM, wordprocessor, spreadsheet, ADFS 2.1 cartridge and choice of drives and monitors.
A — twin 3.5" drives.
B — twin 5.25 drives.
C — one 3.5" and one 5.25" drive.
The price of the complete system depends on the choice of monitor:
- *without monitor:* **£640.00**
— *with 12" green or amber monitor* **£730.00**
- *with 14" colour (Philips CM8833 or Acorn) monitor* **£840.00**
Free demo disc with each system.
Data sheet available on request.



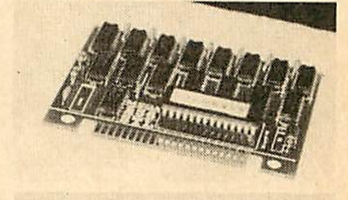
COMPACT:

Our Master Compact systems comprise the COMPACT with 128K RAM, CDFS 2.1 ROM, the same choice of disc drives as with our MASTER systems and choice of monitor.
- *with TV modulator* .... **£499 inc.**
- *with 12" green Acorn monitor* .... **£599 inc.**
- *with 14" colour Acorn monitor* .... **£759 inc.**
Free demo disc with each system.

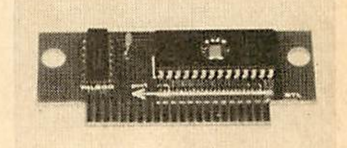
THE PC-500:
The PC-500 is just what you need to take advantage of the biggest software investment on earth: PC software, PC public domain and PC shareware.
The PC-500 is the Acorn 80186 internal co-processor for the MASTER adapted by Solidisk with an appropriate lead for use on the BEEB (and the Master).
It has a mouse, 512K of RAM, 10MHz — 16 bit CPU (around 3 times the speed of the normal PC), 4 software discs containing the Digital GEM operating system, a wordprocessor, a painting program, CPM emulator and other utilities.
Price: **£239 inclusive.** Your BEEB must have a WD-1770 and ADFS.
Data sheet available on request.



THE PC-PLUS:
The PC-PLUS is an expanded PC-500, with one Megabyte of RAM instead of 512K. The extra memory allows large applications such as Desk Top Publishing (eg Fleet Street Editor) to be used on the BEEB or the MASTER.
The PC-PLUS is supplied with the same accessories as the PC-500 including the mouse and 4 discs. Price **£339 inc.**
Upgrade from an existing Acorn 80186 costs **£119.00** but you will be required to sign a service agreement. Please ring for details.
Data sheet available on request.



TURBO-BEEB:
The TURBO-BEEB plugs directly into the TUBE connector of your BEEB and consists of the Acorn TURBO 64K, 4MHz 65C02 internal co-processor for the MASTER adapted by Solidisk with an appropriate lead for use on the BEEB (and the Master), like the PC-500. Price **£135.00 inc.**
Data sheet available on request.



MASTER MEGA CARD:
The MEGA CARD (256K) plugs into a cartridge slot on the MASTER and adds instantly 256K of RAM. The card can be used as RAMDISK, printer buffer or sideways RAM. Price **£100.00 inc.**
Data sheet available on request.

MASTER ROM CARTRIDGE:
Our MASTER ROM CARTRIDGES can accommodate all software EPROM/ROM useable on the MASTER. They are small enough to be kept permanently inside the computer if you wish. Thus capable of accommodating bulky ROMs such as Interword and Interbase or protecting your ROM from being 'borrowed'. Price **£4.00** without plastic case, **£5.00** with plastic case. Prices start as low as **£1** each for large quantities.

SPECIAL DRIVE LEADS:
We have 3 different DRIVE SPECIAL LEAD SETS to accommodate two 3.5" drives or two 5.25" drives or one of each. Each set comprises a special data lead and a special power lead.
BEEB or MASTER **£15.00**
COMPACT **£17.00**
ARCHIMEDES **£16.00**

IMPORTANT NOTICE ON TRADE UP:
Solidisk will accept return of STL memory board up to one YEAR old for TRADING UP. The selling price (below) is the price we sell at the time of the trade-up transaction. In all cases, the minimum balance must be at least £25.00 inclusive of VAT.

Age	Trade-up allowance
Up to 3 months	90% of selling price
Up to 6 months	75% of selling price
Up to 12 months	50% of selling price

BEST PRICE PROMISE:
We guarantee that our prices on selected systems are THE BEST and to prove it, we promise you that if you find the same system sold cheaper by any other officially listed Acorn dealer within ten days of your purchase, we will refund you the difference. Our PRICE PROMISE does not affect your statutory rights.

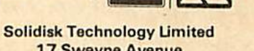
MASTERPLAN:
If you are thinking of exchanging your BEEB for a MASTER or an ARCHIMEDES, Solidisk MASTERPLAN is for you. We can quote immediately over the phone the buy-back value of your BEEB and the balance on your new system. So please give us a try!

ORDERING BY POST:
All items can be ordered by post, sending the coupon below and enclosing cheques, POs, drafts or credit card numbers or by phone. P and P is charged as *follows:*
Less than 1 KG (eg software, cartridges and books): **£2.00**
Up to 3 KGs (eg single disc drives): **£3.00**
Up to 10 KGs (eg computer, monitors, printers, twin disc drives): you can specify either parcel post £6.00 or courrier/Datapost: **£12.00.**
Above 10 KGs (eg complete system), please either allow generously or give us a ring for quotation.

Please fill and send to:
Solidisk Technology Ltd
17 Sweyne Avenue
Southend-on-Sea,
Essex SS2 6JQ

Name: ....
Address: ....
....
....
Items: ....
....
Price: ....
P&P: £2/£3/£6/£12
Total: ....
Access/Barclay





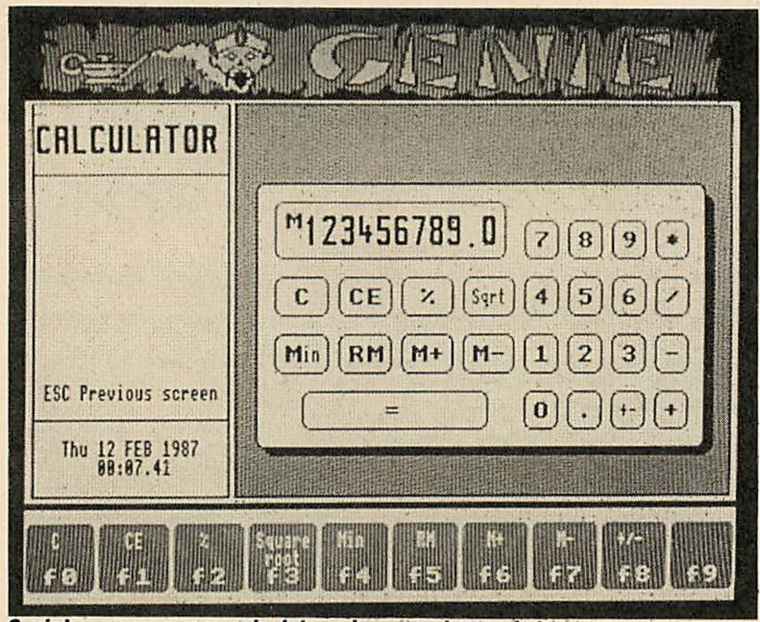
Solidisk Technology Limited
17 Sweyne Avenue
Southend-on-Sea, Essex SS2 6JQ
Tel: Southend (0702) 354674 (16 lines)

- ON-SEA, ESSEX SS2 6JQ TEL: SOUTHEND (0702) 354674 (16 lines)

COMPETITION

AT YOUR COMMAND

Fill in the blanks in the table of addresses correctly, and you could win a copy of *Genie*, the pop-up utility package from PMS



***Genie* has an on-screen calculator using normal numeric keys**

Routine	Hex	Decimal	Octal	Binary
osbyte	-	65524	177764	-
osfind	-	65486	-	-
osgbpb	FFD1	-	-	-
cliv	020B	-	1010	-
osword	-	-	-	1111111111110001
rdchv	-	528	-	1000010000
oscli	FFF7	-	177767	-

Stick this table on a postcard if you wish, and fill in the gaps

This month's competition relies on number bases. Above is a table of numbers, each an important address in the BBC micro's operating system. These addresses are usually quoted in hexadecimal, base 16. In hex, the letters from A to F are used to represent the 'digits' from 11 to 15.

The table also includes the same addresses in the familiar base 10, in octal (base eight) and in binary (base two). But some of the addresses are missing. Fill in all the gaps and you could win yourself one of two copies of Permanent Memory Systems' *Genie* package that we have as prizes.

Genie is a pop-up utility that provides an address and telephone book, a note-pad for jotting down quick reminders to yourself, a diary to write down your appointments, and an on-screen calculator, simply at the touch of a button.

The *Genie* can be summoned by pressing CTRL-Shift-G at any time – even within another program, such as *Wordwise* or *View*. And when you're finished, *Genie* puts you back right where you started with nothing altered. *Genie* is totally self contained and no access to disc is required nor do you need to have a disc drive.

Because *Genie* has a battery-backed memory, the data you type in doesn't get lost when you switch off the micro, and you can protect the data with a password if you want.

Write the completed table on a postcard or the back of an envelope, add your name and address and the competition coupon from the bottom of the page, and send it to September Competition, *Acorn User*, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF. The first two names with correct answers drawn out of the *AU* hat on 16 October will win *Genie*. We cannot accept entries without the coupon. The Editor's decision is final. No other correspondence to be included with entries, please.

ACORN USER
COMPETITION
SEPTEMBER

NOW AVAILABLE FOR THE ACORN ELECTRON

STRYKERS RUN

Commander Stryker under fire in the city

Battling in the air

An action close-up

Enemy equipment (Enhanced BBC Master version)

A camouflaged Battle fortress (Enhanced BBC Master version)

STRYKER'S RUN for the BBC Micro B, B+, Master, Master Compact, and Acorn Electron

Stryker's Run features probably the best graphics ever seen on the BBC Micro or Acorn Electron; the action is intense and the animation is superlative.

The battlefield graphics include cities, edifices, wrecked buildings, trees, gravestones, bridges, despatch-posts, military bases, helicopters and jet ships, with hills and mountains in the background. The Master-enhanced version also includes statues, watch-towers, a neglected cafe, a deserted cinema, aircraft hangars, aeroplanes, trucks and tanks.

For many years, a war has ensued between the Allied Nations and the Volgans. The battle was reaching a stalemate position, but recently the Allies through good intelligence work and some luck have managed to obtain the plans of the Volgan's next offensive. If the Allied Forces can capitalise on these plans they can end the impasse and the war. You play the role of Commander John Stryker commissioned to take this top-secret information to the Allies' HQ.

Your character in the game can jump, run, duck, fire his laser pistol and throw grenades. He can also board aircraft and fly them, making use of their more powerful weaponry.

Your opponents, the Volgans, have a variety of weapons at their disposal comprising rifles, pistols, grenades, machine-guns, mortars, mines, helicopter gunships, rocket launchers and SAM missiles.

Stryker's Run is one of our most successful releases ever. It has topped the BBC Micro software charts for six weeks and received several glowing reviews: *"The graphics are stunning . . . This should be in every collection"* enthused A & B Computing.

Enhanced Version for the BBC Master Series

Stryker's Run is the first release to include a specially enhanced version for the BBC Master making use of its 128K of RAM.

An extra 40K of detailed graphics are provided together with additional game features and atmospheric music.

BBC Micro Cassette	£9.95	BBC Micro 5¼" Disc	£11.95
BBC Master Compact 3½" Disc	£14.95	Acorn Electron Cassette	£9.95

The screen pictures show the BBC Micro version of the game.
The graphics of other versions may vary.



ACORNSOFT

Dept. STR2, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453.

Please make all cheques payable to "Superior Software Ltd".





24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

WHY

buy time switches, a burglar alarm, and enough wiring to make it all happen?







WHEN





Red Boxes provide a home automation and security system that . . .

WORKS OFF YOUR MICRO

Announces an intruder

Starts the washing machine

NEEDS NO SPECIAL WIRING

Discourages the would-be burglar

Tells you when the baby's crying

IS SIMPLE TO INSTALL AND USE

Switches on the electric blanket

Wakes you for Breakfast Time

DOESN'T TIE UP YOUR COMPUTER

Turns on the dishwasher

Controls your heating

IS EASY TO PROGRAM

Turns on the light when you walk in

Puts the kettle on

GIVES YOU A NETWORKING FACILITY

Switches on Crossroads

Switches off Crossroads

AND COSTS JUST £129

With Red Boxes home automation becomes a reality at last. Programmed simply and easily via your micro, Red Boxes use the mains wiring of your home to send signals which will control any appliance powered by a standard 13amp socket. That gives you control over your home environment – without wires trailing all over the place.*

Home automation with Red Boxes also provides a sophisticated security system. At one level, it is an efficient burglar alarm which can detect and announce an intruder. At another level, you can make your house appear full of life when nobody's at home, simply by programming lights, television and radio to operate in your absence.

And if you have two micros, with Red Boxes you've got a local area network as well. It's a system that expands with your needs – and your imagination in home automation applications.

Most remarkable of all, the Red Boxes starter system costs only £129. And additional Red Boxes cost just £34.95. Get yours now, by clipping the coupon. Credit card holders can call 0480 87464.

** The Red Boxes system will work off an Amstrad, BBC Micro, Commodore 64, IBM PC or Spectrum 48k/128k.*

To: Electronic Fulfilment Services, Chesterton Mill, French's Road, Cambridge CB4 3NP.

- ☐ *Please send me further details of the Red Boxes system.*
- ☐ *Please send me a Red Box starter system at £133 (including £4 p&p).*

My computer is a:

- ☐ *Amstrad*
- ☐ *BBC Micro*
- ☐ *Commodore 64*
- ☐ *IBM PC*
- ☐ *PC Compatible*
- ☐ *Spectrum 48k/128k*

Also include:

. . . project manuals at £9.95

. . . additional Red One control boxes at £36.95 each (including £2 p&p).

. . . additional Red Two infra red sensors at £36.95 each (including £2 p&p).

- ☐ *I enclose my cheque for a total of £........ made payable to General Information Systems Ltd., Readers' Account.*
- ☐ *Please charge a total of £........ to my Access/American Express card.*

Account number................................

Signature...

Name ____________________

Address ____________________

____________________ *Postcode* __________



For credit card orders or further information, call 0480 87464.

YELLOW PAGES

INDEX/COMPATIBILITY

Entering listings

To make the task of entering listings easier, *Acorn User* has adopted several standards in the yellow pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the yellow pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the yellow pages will help you spot extra or missing characters.

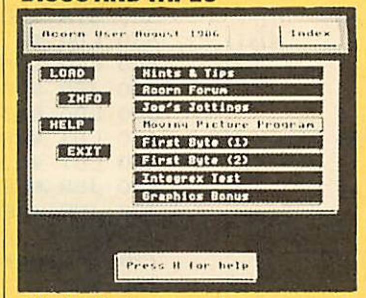
To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating systems OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide an easy-to-complete 'How To Enter' box.

Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. If you still have difficulties, you can also send off for a list of *Checksums* which help you find the errors. Send a large sae (26p stamp) to *AU*Checksums, PO Box 641, London NW9 8TF.





DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 121 for details of how to order.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	106										
Listings 3-5		■	■	■	■	■	■	■	■	■	■
First Byte	107										
Listings 2-3		■	■	■	■	■	■	■	■	■	■
Acorn Forum	107										
Listings 1-2 (1)		■	■	■	■	■	■	■	■	■	■
Joe's Jottings	109										
Listing 1		■	■	■	■	■	■	■	■	■	■
Listings 2(2)-3		■	■	■	■		■	■	■	■	■
Filling out Fil.s	114										
Listing 1		■(3)	■	■	■(4)		■	■	■	■	■
Get the Picture	118										
Listing 1		■				■	■	■	■	■	■
Listings 2-5		■	■	■	■	■	■	■	■	■	■

Notes 1: Listing 2 requires Basic 2. 2: Requires shadow RAM. 3: Requires sideways RAM. 4: DFS ROM image from Welcome disc required

See Hints & Tips, page 35

Listing 3. Handling money

```
   10 REM Hints & Tips -  Listing 3
   20 REM by Martin Phillips
   30 REM for B/B+/M/C/E
   40 REM (c) Acorn User Sept 1987
   50 :
   60 @%=&20200
   70 amount%=0
   80 PRINT "Press 0 to end"
   90 REPEAT
  100 INPUT "Amount in pounds and pence
`" amount
  110 amount%=amount%+amount*100
  120 UNTIL amount=0
  130 INPUT "Enter total `" total
  140 total%=total*100
  150 IF amount%=total% PRINT "Figures a
gree"
  160 PRINT "`"; amount%/100; SPC(5) "`"
; total%/100
```

Listing 4. Checking totals

```
   10 REM Hints & Tips -  Listing 4
   20 REM by Martin Phillips
   30 REM for B/B+/M/C/E
   40 REM (c) Acorn User Sept 1987
   50 :
   60 @%=0
   70 tot=0
   80 PRINT "Press 0 to end"
   90 REPEAT
  100 INPUT "Amount in pounds and pence
`" amount
  110 tot=tot+amount
  120 UNTIL amount=0
  130 INPUT "Enter total `" total
  140 IF ABS(tot-total)<0.01 THEN PRINT
"Figures agree"
  150 PRINT "`"; tot; SPC(5) "`"; total
```

Listing 5. ROM image into sideways RAM

```
   10 REM Hints & Tips - Listing 5
   20 REM by Stephen Baxter
   30 REM for B/B+/M/C/E
   40 REM (c) Acorn User Sept 1987
   50 :
   60 FOR pass=0 TO 3 STEP 3
   70 P%=&900
   80 [
   90 OPT pass
  100 .loadram
  110 LDY #0
  120 .copy
  130 LDA &705,Y
  140 CMP #13
  150 BEQ out
  160 STA here,Y
  170 INY
  180 JMP copy
  190 :
  200 .out
  210 LDX #loadit MOD 256
  220 LDY #loadit DIV 256
  230 JSR &FFF7
  240 LDX #0
  250 :
  260 .check
  270 CPX #17
  280 BEQ rammessage
  290 INX
```

Continued ▶

◀ Hints & Tips listing 5 continued

```
  300 STX &FE30
  310 LDA #0
  320 STA &8000
  330 LDA &8000
  340 CMP #0
  350 BNE check
  360 LDA #255
  370 STA &8000
  380 LDA &8000
  390 CMP #255
  400 BNE check
  410 STX &FE30
  420 LDA #&3B
  430 STA &83
  440 LDA #&80
  450 STA &85
  460 LDY #0
  470 STY &82
  480 STY &84
  490 LDA #&40
  500 STA &81
  510 :
  520 .loop
  530 LDA (&82),Y
  540 STA (&84),Y
  550 INY
  560 BNE loop
  570 INC &83
  580 INC &85
  590 DEC &81
  600 BNE loop
  610 LDA &F4
  620 STA &FE30
  630 LDA #7
  640 JSR &FFEE
  650 JSR &FFE0
  660 LDA #151
  670 LDX #78
  680 LDY #127
  690 JSR &FFF4
  700 JMP (&FFFC)
  710 :
  720 .rammessage
  730 BRK
  740 OPT FNequs("No sideways RAM"+CHR$1
3)
  750 BRK
  760:
  770 .loadit
  780 OPT FNequs("*LOAD ")
  790 .here
  800 OPT FNequs(STRING$(8," ")+"3B00"+C
HR$13)
  810 ]
  820 NEXT
  830 :
  840 S%=0
  850 FOR I%=&900 TO &9AE
  860 S%=S%+?I%
  870 NEXT
  880 IF S%<>&4DE4 THEN PRINT "Checksum
error - please check listing":END
  890 :
  900 PRINT "Press SPACE to save"
  910 A$=GET$
  920 IF A$=" " THEN *SAVE "RAM" 900 +10
0
  930 END
  940 :
  950 DEF FNequs (string$)
  960 $P%=string$
  970 P%=P%+LENstring$
  980 =pass
```

See First Byte, page 41

Listing 2. Use of the USR command

```
10 REM USR Demo
20 REM by Tessie Revivis
30 REM for B/B+/E/M/C
40 REM (c) Acorn User Sept 1987
50 :
60 DIM code% 255
70 oswrch=&FFEE
80 PROCassemble
90 CLS
100 INPUT "Accumulator ",A%
110 INPUT "X Register  ",X%
120 INPUT "Y Register  ",Y%
130 INPUT "Carry Flag (1/0)",C%
140 result%=USR(code%)
150 PRINT "Result: ";~result%
160 END
170 :
180 DEF PROCassemble
190 FOR pass=0 TO 3 STEP 3
200 P%=code%
210 [
220 OPT pass
230 INX
240 INX
250 INX
260 INY
270 INY
280 CLC
290 ASL A
300 RTS
310 ]
320 NEXT
330 ENDPROC
```

Listing 3. Call parameter block

```
10 REM CALL Demo
20 REM by Tessie Revivis
30 REM For B/B+/E/M/C
40 REM (c) Acorn User Sept 1987
50 :
60 DIM code 255
70 oswrch=&FFEE
80 :
90 PROCassemble
100 PRINT ''
110 B%=&12345678
120 B$="Acorn User"
130 CALL code, B%, B$
140 PRINT SPC(8) "Memory dump"'
150 FOR addr=&600 TO &606
160 PRINT ~addr,~?addr
170 NEXT
180 END
190 :
200 DEF PROCassemble
210 FOR pass=0 TO 3 STEP 3
220 P%=code
230 [
240 OPT pass
250 LDA #7
260 JSR oswrch
270 RTS
280 ]
290 NEXT
300 ENDPROC
```

See Acorn Forum, page 45

Listing 1. Three new fonts

```
   10 REM New Screen Fon
ts
   20 REM by Daniel Nead
es
   30 REM for B/B+/E/M/C
   40 REM (c) Acorn User
 Sept 87
   50 :
   60 DIM Q% 300
   70 S%=Q%
   80 PRINT "Which type
of font do you want?"
   90 PRINT "1) Bold 2)
Thin 3) Italics"
  100 INPUT "Type 1,2 or
 3 : " T%
  110 IF T%=1 THEN PROCb
old
  120 IF T%=2 THEN PROCt
hin
  130 IF T%=3 THEN PROCi
talics
  140 FOR F=32 TO 126
  150 PROCfont(F)
  160 NEXT F
  170 END
  180 :
  190 DEF PROCfont(N)
  200 ?S%=N
  210 A%=10:X%=S%:Y%=S%
DIV 256
```

Continued ►

◄ Acorn Forum listing 1 continued

```
  220 CALL &FFF1
  230 CALL code
  240 VDU 23,N,S%?1,S%?2
,S%?3,S%?4,S%?5,S%?6,S%?
7,S%?8
  250 ENDPROC
  260 :
  270 DEF PROCbold
  280 P%=S%+20:code=P%:a
ddress=S%
  290 FOR loop=1 TO 8 :
[
  300 LDA address+loop
  310 LSR address+loop
  320 ORA address+loop
  330 STA address+loop :
 ]
  340 NEXT loop
  350 [ RTS : ]
  360 ENDPROC
  370 :
  380 DEF PROCthin
  390 P%=S%+20:code=P%:a
ddress=S%
  400 FOR loop=1 TO 8 :
[
  410 LDA address+loop
  420 LSR address+loop
  430 AND address+loop
  440 STA address+loop :
 ]
  450 NEXT loop
```

Continued ►

◄ Acorn Forum listing 1 continued

```
  460 [ RTS : ]
  470 ENDPROC
  480 :
  490 DEF PROCitalics
  500 P%=S%+20:code=P%:a
ddress=S%
  510 [LSR address+1
  520 LSR address+1
  530 LSR address+2
  540 LSR address+3
  550 ASL address+6
  560 ASL address+7
  570 ASL address+8
  580 RTS : ]
  590 ENDPROC
```

Listing 2. Machine code program find

```
   10 REM ADFS File Find
er
   20 REM by David Spenc
er
   30 REM for B/B+/E/M/C
 with ADFS
   40 REM (c) Acorn User
 Sept 1987
   50 :
   60 namptr = &A8
   70 temp = &AA
```

Continued ►

◄ **Acorn Forum listing 2 continued**

```
   80 depth = &AC
   90 ad = &AD
  100 fnd = &AF
  110 :
  120 osargs = &FFDA
  130 osasci = &FFE3
  140 osnewl = &FFE7
  150 osword = &FFF1
  160 osbyte = &FFF4
  170 :
  180 PROCassemble
  190 PROCchecksum
  200 A$="SAVE FIND "+STR$~code+" "+STR$~O%+" FFFF0E00 FFFF0E00"
  210 PRINT A$ '"Press space to save"
  220 IF GET$=" " OSCLI A$
  230 END
  240 :
  250 DEF PROCassemble
  260 DIM code &900
  270 FOR pass=0 TO 3 STEP 3
  280 P%=&E00:O%=code
  290 [OPT pass+4
  300 LDX #namptr
  310 LDY #0
  320 LDA #1
  330 JSR osargs
  340 LDY #0
  350 .nget
  360 LDA (namptr),Y
  370 INY
  380 CMP #ASC" "
  390 BEQ nget
  400 BCC non
  410 DEY
  420 LDX #0
  430 .nget2
  440 LDA (namptr),Y
  450 STA lbuff,X
  460 CMP #&21
  470 BCC nget3
  480 INX
  490 INY
  500 BNE nget2
  510 .nget3
  520 LDA #13
  530 STA lbuff,X
  540 BNE sst3
  550 .non
  560 LDX #0
  570 .mess
  580 LDA nmess,X
  590 BEQ mess2
  600 JSR osasci
  610 INX
  620 BNE mess
  630 .mess2
  640 LDX #rblk MOD &100
  650 LDY #rblk DIV &100
  660 LDA #0
  670 JSR osword
  680 BCC notesc
  690 .esc
  700 LDA #&7E
  710 JSR osbyte
  720 BRK
  730 EQUB &11
  740 EQUS "Escape"
  750 EQUB 0
  760 :
  770 .notesc
  780 LDX #0
  790 LDY #0
  800 .sst
  810 LDA lbuff,X
  820 INX
  830 CMP #ASC" "
  840 BEQ sst
  850 DEX
  860 .sst2
  870 LDA lbuff,X
  880 STA lbuff,Y
  890 CMP #ASC" "
  900 BEQ sst25
  910 INY
  920 INX
  930 CPY #10
  940 BEQ sst3
  950 BNE sst2
  960 .sst25
  970 LDA #13
  980 STA lbuff,Y
  990 .sst3
 1000 LDA #0
 1010 STA fnd
 1020 STA depth
 1030 LDA #(root-22) MOD &100
 1040 STA namptr
 1050 LDA #(root-22) DIV &100
 1060 STA namptr+1
 1070 JSR find
 1080 LDA fnd
 1090 BMI ffnd
 1100 BRK
 1110 EQUB 124
 1120 EQUS "Not found"
 1130 EQUB 0
 1140 :
 1150 .ffnd
 1160 JMP osnewl
 1170 :
 1180 .find
 1190 INC depth
 1200 LDY #22
 1210 LDX #8
 1220 .find2
 1230 LDA (namptr),Y
 1240 STA ad-22,Y
 1250 STA wblk,X
 1260 INY
 1270 DEX
 1280 CPX #5
 1290 BNE find2
 1300 JSR read
 1310 LDA #(dbuff+5) MOD &100
 1320 STA namptr
 1330 LDA #(dbuff+5) DIV &100
 1340 STA namptr+1
 1350 LDA depth
 1360 SEC
 1370 SBC #1
 1380 STA temp
 1390 ASL A
 1400 ASL A
 1410 CLC
 1420 ADC temp
 1430 ASL A
 1440 TAX
 1450 LDA #(dbuff+&4CC) DIV &100
 1460 STA temp+1
 1470 LDA #(dbuff+&4CC) MOD &100
 1480 STA temp
 1490 LDY #0
 1500 .find25
 1510 LDA (temp),Y
 1520 AND #&7F
 1530 STA nbuff,X
 1540 INX
 1550 INY
 1560 CPY #10
 1570 BNE find25
 1580 .find29
 1590 LDY #0
 1600 LDA (namptr),Y
 1610 BNE find30
 1620 JMP find7
 1630 .find30
 1640 LDY #3
 1650 LDA (namptr),Y
 1660 BMI find4
 1670 LDY #0
 1680 .find3
 1690 LDA (namptr),Y
 1700 AND #&7F
 1710 EOR lbuff,Y
 1720 AND #&DF
 1730 BNE find4
 1740 LDA lbuff,Y
 1750 CMP #13
 1760 BEQ find35
 1770 INY
 1780 CPY #10
 1790 BNE find3
 1800 .find35
 1810 LDX #0
 1820 .prt
 1830 LDY #0
 1840 .prt1
 1850 TYA
 1860 PHA
 1870 .prt2
 1880 LDA nbuff,Y
 1890 AND #&7F
 1900 CMP #13
 1910 BEQ prt3
 1920 JSR osasci
 1930 INY
 1940 CPY #10
 1950 BNE prt2
 1960 .prt3
 1970 LDA #ASC"."
 1980 JSR osasci
 1990 PLA
 2000 CLC
 2010 ADC #10
 2020 TAY
 2030 INX
 2040 CPX depth
 2050 BNE prt1
 2060 LDY #0
 2070 .prt4
 2080 LDA (namptr),Y
 2090 AND #&7F
 2100 CMP #13
 2110 BEQ prt5
 2120 JSR osasci
 2130 INY
 2140 CPY #10
 2150 BNE prt4
 2160 .prt5
 2170 JSR osnewl
 2180 LDA fnd
 2190 BMI find4
```

Continued ►

JOE'S JOTTINGS

◀ **Acorn Forum listing 2 continued**

```
2200 DEC fnd
2210 .find4
2220 LDY #3
2230 LDA (namptr),Y
2240 BPL find5
2250 LDA ad
2260 PHA
2270 LDA ad+1
2280 PHA
2290 LDA ad+2
2300 PHA
2310 LDA namptr
2320 PHA
2330 LDA namptr+1
2340 PHA
2350 JSR find
2360 PLA
2370 STA namptr+1
2380 PLA
2390 STA namptr
2400 PLA
2410 STA ad+2
2420 STA wblk+6
2430 PLA
2440 STA ad+1
2450 STA wblk+7
2460 PLA
2470 STA ad
2480 STA wblk+8
2490 JSR read
2500 .find5
2510 LDA namptr
2520 CLC
2530 ADC #26
2540 STA namptr
2550 BCC find6
2560 INC namptr+1
2570 .find6
2580 LDY #0
2590 LDA (namptr),Y
2600 BEQ find7
2610 JMP find29
2620 .find7
2630 DEC depth
2640 RTS
2650 :
2660 .read
2670 LDX #wblk MOD &100
2680 LDY #wblk DIV &100
2690 LDA #&72
2700 JSR osword
2710 LDA wblk
2720 BEQ readok
2730 LDX #eblk MOD &100
2740 LDY #eblk DIV &100
2750 LDA #&73
2760 JSR osword
2770 LDA eblk+3
2780 AND #&7F
2790 LDX #&E
2800 JSR conv
2810 LDY #2
2820 LDX #&15
2830 .secv
2840 LDA eblk,Y
2850 JSR conv
2860 INX
2870 DEY
2880 BPL secv
2890 JMP err
2900 :
2910 .readok
2920 BIT &FF
2930 BPL nesc
2940 JMP esc
2950 .nesc
2960 LDX #3
2970 .chkhugo
2980 LDA id,X
2990 CMP dbuff+1,X
3000 BNE badd
3010 CMP dbuff+1275,X
3020 BNE badd
3030 DEX
3040 BPL chkhugo
3050 LDA dbuff
3060 CMP dbuff+1274
3070 BNE badd
3080 RTS
3090 .badd
3100 BRK
3110 EQUB 125
3120 EQUS "Bad tree"
3130 EQUB 0
3140 :
3150 .conv
3160 PHA
3170 LSR A
3180 LSR A
3190 LSR A
3200 LSR A
3210 JSR conv2
3220 PLA
3230 AND #&F
3240 INX
3250 .conv2
3260 ORA #&30
3270 CMP #&3A
3280 BCC conv3
3290 ADC #6
3300 .conv3
3310 STA err,X
3320 RTS
3330 :
3340 .wblk
3350 EQUB 0
3360 EQUD dbuff
3370 EQUB 8
3380 EQUB 0
3390 EQUW 0
3400 EQUB 5
3410 :
3420 .root
3430 EQUB 2
3440 EQUW 0
3450 :
3460 .nmess
3470 EQUB 13
3480 EQUS "File to find ? "
3490 EQUB 0
3500 :
3510 .rblk
3520 EQUW lbuff
3530 EQUB 10
3540 EQUB &20
3550 EQUB &7E
3560 :
3570 .lbuff
3580 EQUS STRING$(10,".")
3590 :
3600 .dbuff
3610 EQUS STRING$(255,".")
3620 EQUS STRING$(255,".")
3630 EQUS STRING$(255,".")
3640 EQUS STRING$(255,".")
3650 EQUS STRING$(255,".")
3660 EQUS STRING$(5,".")
3670 :
3680 .nbuff
3690 EQUS STRING$(255,".")
3700 :
3710 .eblk
3720 EQUB 0
3730 EQUD 0
3740 :
3750 .id
3760 EQUS "Hugo"
3770 :
3780 .err
3790 BRK
3800 EQUB 126
3810 EQUS "ADFS error &00"
3820 EQUS " "
3830 EQUS "at &000000"
3840 EQUB 0
3850 :
3860 ]NEXT
3870 ENDPROC
3880 :
3890 DEF PROCchecksum
3900 T%=0
3910 FOR I%=code TO code+2135
3920 T%=T%+?I%
3930 NEXT
3940 IF T%=134738 THEN ENDPROC
3950 PRINT CHR$7+"Checksum error - please check listing"
3960 END
```

◀ **See Going Greek, page 73**

Listing 1. Greek alphabet file

```
10 REM Greek alphabet file
20 REM by Joe Telford
30 REM for B/B+/M/C
40 REM (c) Acorn User September 1987
50 :
```

Continued ▶

◀ **Joe's Jottings listing 1 continued**

```
60 VDU 23,192,0,0,63,96,96,62,3,62
70 VDU 23,193,28,54,99,99,127,99,99,0
80 VDU 23,194,126,51,51,62,51,51,126,0
90 VDU 23,195,62,99,99,127,99,99,62,0
```

Continued ▶

◀ Joe's Jottings listing 1 continued

```
100 VDU 23,196,28,28,54,54,99,99,127,0
110 VDU 23,197,127,51,48,62,48,51,127,
0
120 VDU 23,198,62,8,62,107,62,8,62,0
130 VDU 23,199,127,99,96,96,96,96,96,0
140 VDU 23,200,99,99,54,28,54,99,99,0
150 VDU 23,201,60,24,24,24,24,24,60,0
160 VDU 23,202,119,51,51,63,51,51,119,
0
170 VDU 23,203,99,102,108,120,108,102,
99,0
180 VDU 23,204,28,28,54,54,99,99,99,0
190 VDU 23,205,99,119,127,107,99,99,99
,0
200 VDU 23,206,99,115,123,111,103,99,9
9,0
210 VDU 23,207,62,99,99,99,99,99,62,0
220 VDU 23,208,127,54,54,54,54,54,54,0
230 VDU 23,209,62,8,107,107,62,8,62,0
240 VDU 23,210,126,51,51,62,48,48,120,
0
250 VDU 23,211,127,99,48,24,48,99,127,
0
260 VDU 23,212,126,90,24,24,24,24,24,0
270 VDU 23,213,102,102,102,60,24,24,60
,0
280 VDU 23,214,102,102,102,60,24,24,60
,0
290 VDU 23,215,62,99,99,99,54,54,99,0
300 VDU 23,216,126,0,0,60,0,0,126,0
310 VDU 23,217,127,99,96,96,96,96,96,0
320 VDU 23,218,126,102,12,24,48,102,12
6,0
330 VDU 23,219,124,96,96,96,96,96,124,
0
340 VDU 23,220,0,96,48,24,12,6,0,0
350 VDU 23,221,62,6,6,6,6,6,62,0
360 VDU 23,222,24,60,102,66,0,0,0,0
370 VDU 23,223,0,0,0,0,0,0,0,255
380 VDU 23,224,28,54,48,124,48,48,126,
0
390 VDU 23,225,0,0,59,110,102,110,59,0
400 VDU 23,226,30,51,51,62,51,51,62,96
410 VDU 23,227,60,102,102,126,102,102,
60,0
420 VDU 23,228,60,96,48,60,102,102,60,
0
430 VDU 23,229,0,0,30,48,28,48,30,0
440 VDU 23,230,0,0,62,107,107,62,24,24
450 VDU 23,231,0,0,102,54,28,24,48,48
460 VDU 23,232,0,0,102,54,28,28,54,51
470 VDU 23,233,0,0,24,24,24,24,12,0
480 VDU 23,234,0,0,124,102,102,102,6,6
490 VDU 23,235,0,0,102,108,120,108,102
,0
500 VDU 23,236,96,48,24,28,54,99,99,0
510 VDU 23,237,0,0,51,51,51,51,62,96
520 VDU 23,238,0,0,99,51,27,30,28,0
530 VDU 23,239,0,0,62,99,99,99,62,0
540 VDU 23,240,0,0,127,54,54,54,54,0
550 VDU 23,241,0,0,99,107,107,62,24,24
560 VDU 23,242,0,0,60,102,102,124,96,9
6
570 VDU 23,243,0,0,63,102,102,102,60,0
580 VDU 23,244,0,0,126,24,24,24,12,0
590 VDU 23,245,0,0,115,51,51,51,30,0
600 VDU 23,246,0,0,115,51,51,51,30,0
610 VDU 23,247,0,0,54,99,107,127,54,0
620 VDU 23,248,60,96,96,60,96,96,62,6
630 VDU 23,249,0,0,102,54,28,24,48,48
640 VDU 23,250,62,12,24,48,96,96,62,6
650 VDU 23,251,12,24,24,112,24,24,12,0
660 VDU 23,252,24,24,24,0,24,24,24,0
670 VDU 23,253,48,24,24,14,24,24,48,0
680 VDU 23,254,49,107,70,0,0,0,0,0
```

Listing 2. Greek numbers

```
10 REM Greek numbers
20 REM by Dzo Telfort
30 REM for B+/M/C
40 REM (c) Acorn User Sept 1987
50 :
60 MODE 129
70 VDU 19,0,4;0;
80 PROCsetup
90 PROCtitle
100 REPEAT
110 score=0
120 qu=10
130 top=FNchooserange
140 FOR quest%=1 TO qu
150 PROCtitle
160 no=FNchooseno(top)
170 PROCsetq(quest%,top$,no,score)
180 ans=FNgetans
190 PROCgetscore(no,ans)
200 NEXT
210 UNTIL FALSE
220 :
230 DEF PROCgetscore(n,a)
240 IF n=a THEN PROCcorrect ELSE PROCw
rong
250 ENDPROC
260 :
270 DEF PROCcorrect
280 PROCdouble(FNgreek("  Swsto@......
..poli kala  "),-1,26,1,2)
290 score=score+1
300 PROCscore(score)
310 VDU 7
320 dummy=INKEY(500)
330 ENDPROC
340 :
350 DEF PROCwrong
360 PROCdouble(FNgreek(" Lupamai......
.einai laco@ "),-1,26,2,1)
370 SOUND 0,-15,3,10
380 dummy=INKEY(500)
390 ENDPROC
400 :
410 DEF FNgetans
420 COLOUR 2
430 PRINT TAB(12,20) FNgreek("Ti aricm
o; ");
440 COLOUR 3
450 INPUT "" ans
460 =ans
470 :
480 DEF PROCscore(s)
490 PROCdouble(FNgreek("Swsto@  "+STR$
(s)),29,4,2,1)
500 ENDPROC
510 :
520 DEF PROCsetq(n,t$,no,s)
530 PROCdouble(FNgreek(t$),0,1,2,1)
540 PROCdouble(FNgreek("Erwtjsj  "+STR$
(n)),29,1,2,1)
550 PROCdouble(FNgreek("Swsto@  "+STR$
(s)),29,4,2,1)
560 PROCdouble(FNgreek("Poio@ einai o
aricmo@;"),-1,8,2,0)
570 PROCconvert(no)
580 ENDPROC
590 :
600 DEF PROCconvert(n)
610 LOCAL n$,a$,fl
620 fl=0:n$=""
630 IF n>12000 THEN n$=n$+FNthous(n DI
V 1000):n=n MOD 1000:fl=1
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
  640 IF fl=1 AND n=0 THEN ENDPROC
  650 IF n>999 PROCdouble(FNgreek(thou$(
n DIV 1000)),-1,12,3,0):n=n MOD 1000:fl=
1
  660 IF fl=1 AND n=0 THEN ENDPROC
  670 IF n>99 n$=n$+hundred$(n DIV 100)+
" ":n=n MOD 100
  680 IF n>12 n$=n$+ten$(n DIV 10)+" ":n
=n MOD 10
  690 IF n=0 AND n$<>"" THEN PROCdouble(
FNgreek(n$),-1,15,3,0):ENDPROC
  700 PROCdouble(FNgreek(n$+unit$(n)),-1
,15,3,0)
  710 ENDPROC
  720 DEF FNthous(n)
  730 LOCAL n$
  740 n$=""
  750 IF n>99 n$=n$+hundred$(n DIV100)+"
 ":n=nMOD100
  760 IF n>12 n$=n$+ten$(n DIV 10)+" ":n
=n MOD 10
  770 IF n>0 n$=n$+unit$(n)+" "
  780 PROCdouble(FNgreek(n$+"hiliade@"),
-1,12,3,0)
  790 =""
  800 :
  810 DEF FNgreek(m$)
  820 LOCAL loop%,g$,a$:g$=""
  830 FOR loop%= 1 TO LEN m$
  840 a$=MID$(m$,loop%,1)
  850 IF a$>="@" THEN g$=g$+CHR$(ASC(a$)
+128) ELSE g$=g$+a$
  860 NEXT
  870 =g$
  880 :
  890 DEF PROCtitle
  900 COLOUR 129
  910 VDU 26,12
  920 PRINT TAB(0,10);
  930 COLOUR 128:
  940 FOR loop%=1 TO 3:PRINTSTRING$(240,
" ");:NEXT
  950 PROCdouble("The Greek Numbers",-1,
1,2,1)
  960 VDU 28,0,31,39,3
  970 ENDPROC
  980 :
  990 DEF FNchooseno(top)
 1000 dummy=RND(-TIME)
 1010 IF top=1 THEN top$="Apo 0 yia tj 1
2":=(RND(13)-1)
 1020 IF top=2 THEN top$="Apo 10 yia tj
90":=(RND(9)*10)
 1030 IF top=3 THEN top$="Apo 100 yia tj
 900":=(RND(9)*100)
 1040 IF top=4 THEN top$="Apo 1000 yia t
j 12000":=(RND(12)*1000)
 1050 IF top=5 THEN top$="Yia tj 100":=(
RND(101)-1)
 1060 IF top=6 THEN top$="Yia tj 1000":=
(RND(1001)-1)
 1070 IF top=7 THEN top$="Yia tj 10000":
=(RND(10001)-1)
 1080 IF top 8 THEN top$="Yia tj 100000"
:=(RND(100001)-1)
 1090 END
 1100 :
 1110 DEF PROCsetup
 1120 RESTORE
 1130 DIM unit$(12)
 1140 FOR loop%=0 TO 12:READ unit$(loop%
):NEXT:units=12
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
 1150 DIM ten$(9)
 1160 FOR loop%=1 TO 9:READ ten$(loop%):
NEXT:tens=9
 1170 DIM hundred$(9)
 1180 FOR loop%=1 TO 9:READ hundred$(loo
p%):NEXT:hundreds=9
 1190 DIM thou$(12)
 1200 FOR loop%=1 TO 12:READ thou$(loop%
):NEXT:thous=12
 1210 DIM m$(10)
 1220 VDU 23,192,0,0,63,96,96,62,3,62
 1230 VDU 23,193,28,54,99,99,127,99,99,0
 1240 VDU 23,194,126,51,51,62,51,51,126,
0
 1250 VDU 23,195,62,99,99,127,99,99,62,0
 1260 VDU 23,196,28,28,54,54,99,99,127,0
 1270 VDU 23,197,127,51,48,62,48,51,127,
0
 1280 VDU 23,198,62,8,62,107,62,8,62,0
 1290 VDU 23,199,127,99,96,96,96,96,96,0
 1300 VDU 23,200,99,99,54,28,54,99,99,0
 1310 VDU 23,201,60,24,24,24,24,24,60,0
 1320 VDU 23,202,119,51,51,63,51,51,119,
0
 1330 VDU 23,203,99,102,108,120,108,102,
99,0
 1340 VDU 23,204,28,28,54,54,99,99,99,0
 1350 VDU 23,205,99,119,127,107,99,99,99
,0
 1360 VDU 23,206,99,115,123,111,103,99,9
9,0
 1370 VDU 23,207,62,99,99,99,99,99,62,0
 1380 VDU 23,208,127,54,54,54,54,54,54,0
 1390 VDU 23,209,62,8,107,107,62,8,62,0
 1400 VDU 23,210,126,51,51,62,48,48,120,
0
 1410 VDU 23,211,127,99,48,24,48,99,127,
0
 1420 VDU 23,212,126,90,24,24,24,24,24,0
 1430 VDU 23,213,102,102,102,60,24,24,60
,0
 1440 VDU 23,214,102,102,102,60,24,24,60
,0
 1450 VDU 23,215,62,99,99,99,54,54,99,0
 1460 VDU 23,216,126,0,0,60,0,0,126,0
 1470 VDU 23,217,127,99,96,96,96,96,96,0
 1480 VDU 23,218,126,102,12,24,48,102,12
6,0
 1490 VDU 23,219,124,96,96,96,96,96,124,
0
 1500 VDU 23,220,0,96,48,24,12,6,0,0
 1510 VDU 23,221,62,6,6,6,6,6,62,0
 1520 VDU 23,222,24,60,102,66,0,0,0,0
 1530 VDU 23,223,0,0,0,0,0,0,0,255
 1540 VDU 23,224,28,54,48,124,48,48,126,
0
 1550 VDU 23,225,0,0,59,110,102,110,59,0
 1560 VDU 23,226,30,51,51,62,51,51,62,96
 1570 VDU 23,227,60,102,102,126,102,102,
60,0
 1580 VDU 23,228,60,96,48,60,102,102,60,
0
 1590 VDU 23,229,0,0,30,48,28,48,30,0
 1600 VDU 23,230,0,0,62,107,107,62,24,24
 1610 VDU 23,231,0,0,102,54,28,24,48,48
 1620 VDU 23,232,0,0,102,54,28,28,54,51
 1630 VDU 23,233,0,0,24,24,24,24,12,0
 1640 VDU 23,234,0,0,124,102,102,102,6,6
 1650 VDU 23,235,0,0,102,108,120,108,102
,0
 1660 VDU 23,236,96,48,24,28,54,99,99,0
```

Continued ▶

◀ Joe's Jottings listing 2 continued

```
1670 VDU 23,237,0,0,51,51,51,51,62,96
1680 VDU 23,238,0,0,99,51,27,30,28,0
1690 VDU 23,239,0,0,62,99,99,99,62,0
1700 VDU 23,240,0,0,127,54,54,54,54,0
1710 VDU 23,241,0,0,99,107,107,62,24,24
1720 VDU 23,242,0,0,60,102,102,124,96,9
6
1730 VDU 23,243,0,0,63,102,102,102,60,0
1740 VDU 23,244,0,0,126,24,24,24,12,0
1750 VDU 23,245,0,0,115,51,51,51,30,0
1760 VDU 23,246,0,0,115,51,51,51,30,0
1770 VDU 23,247,0,0,54,99,107,127,54,0
1780 VDU 23,248,60,96,96,60,96,96,62,6
1790 VDU 23,249,0,0,102,54,28,24,48,48
1800 VDU 23,250,62,12,24,48,96,96,62,6
1810 VDU 23,251,12,24,24,112,24,24,12,0
1820 VDU 23,252,24,24,24,0,24,24,24,0
1830 VDU 23,253,48,24,24,14,24,24,48,0
1840 VDU 23,254,49,107,70,0,0,0,0,0
1850 :
1860 DATA mjden,ena,duo,tria,tessera,pe
nte,exj,epta,oktw,ennia,deka,enteka,dwde
ka
1870 DATA deka,eikosi,trianta,saranta,p
enjnta,exjnta,ebdomjnta,ogdonta,enenjnta
1880 DATA ekato,diakosia,triakosia,tetr
akosia,pentakosia,exakosia,eptakosia,okt
acosia,enniakosia
1890 DATA hilia,duo hiliade@,tri@ hilia
de@,tesseri@ hiliade@,pente hiliade@,exi
 hiliade@,epta hiliade@,okto hiliade@,en
nia hiliades,deka hiliade@,enteka hiliad
e@,dwdeka hiliade@
1900 ENDPROC
1910 :
1920 DEF FNchooserange
1930 REPEAT
1940 choice=FNwmenu(" Choose Numbers ",
9," Units 0 - 12 "," Tens 10 - 90 "," Hu
ndreds 100 - 900 "," Thousands 1000-1200
0 "," Upto 100 "," Upto 1000 "," Upto 10
000 "," Upto 100000 "," END ","",9,11)
1950 IF choice=9 PRINT '"Ended!":VDU 23
,1,3;0;0;0;:END
1960 UNTIL choice<9
1970 VDU 23,1,3;0;0;0;
1980 =choice
1990 :
2000 DEF FNwmenu(m$(0),max,m$(1),m$(2),
m$(3),m$(4),m$(5),m$(6),m$(7),m$(8),m$(9
),m$(10),x,y)
2010 LOCAL loop%,menuptr,len:len=0
2020 FOR loop%=0 TO 10:IF LEN(m$(loop%)
)>len THEN len=LEN(m$(loop%))
2030 NEXT
2040 VDU 23,1,0;0;0;0;
2050 *FX4,1
2060 PROCopenwindow(x,y,len,max+1)
2070 menuptr=1
2080 REPEAT
2090 PRINT TAB(0,0);
2100 FOR loop%=0 TO max
2110 IF loop%=menuptr OR loop%=0 COLOUR
0:COLOUR 130 ELSE COLOUR 2:COLOUR 128
2120 PRINT m$(loop%);STRING$(len-LEN(m$
(loop%))," ");:NEXT
2130 COLOUR 2:COLOUR 128
2140 key=GET
2150 IF key=139 menuptr=menuptr-1:IF me
nuptr=0:menuptr=max
2160 IF key=138 menuptr=menuptr+1:IF me
nuptr=max+1 menuptr=1
2170 UNTIL key=13
```

Coninued ▶

◀ Joe's Jottings listing 2 continued

```
2180 *FX 4,0
2190 PROCclosewindow(x,y,len,max+1)
2200 =menuptr
2210 :
2220 DEF PROCclosewindow(x,y,len,ht)
2230 VDU 26
2240 GCOL 0,0
2250 PROCopenwindow(x,y,len,ht)
2260 CLS
2270 VDU 26
2280 GCOL 0,1
2290 ENDPROC
2300 :
2310 DEF PROCopenwindow(x,y,len,ht)
2320 VDU 28,x,y+ht,x+len-1,y
2330 PROCrect(x*32-8,1016-(y+ht)*32,len
*32+12,ht*32+12,0)
2340 PROCrect(x*32,1008-(y+ht)*32,len*3
2+16,8,1)
2350 PROCrect((x+len)*32+8,1008-(y+ht)*
32,8,ht*32+8,1)
2360 ENDPROC
2370 :
2380 DEF PROCrect(x,y,l,w,f)
2390 MOVE x,y:DRAW x+l,y
2400 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
2410 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
2420 MOVE x,y+w
2430 IF f=0 DRAW x,y ELSE MOVE x,y
2440 ENDPROC
2450 :
2460 DEF PROCdouble(z$,x,y,f,b)
2470 COLOUR f:COLOUR b+128
2480 LOCAL c%
2490 c%=&70
2500 IF x<0 THEN PRINT TAB(20-LENz$ DIV
2,y);:ELSE PRINT TAB(x,y);
2510 FOR loop%=1 TO LENz$
2520 ?c%=ASC(MID$(z$,loop%,1))
2530 X%=c%MOD256
2540 Y%=c%DIV256
2550 A%=10
2560 CALL &FFF1
2570 VDU 23,128,c%?1,c%?1,c%?2,c%?2,c%?
3,c%?3,c%?4,c%?4,128,10,8,23,128,c%?5,c%
?5,c%?6,c%?6,c%?7,c%?7,c%?8,c%?8,128,11
2580 NEXT
2590 ENDPROC
```

Listing 3. Greek menu

```
10 REM Greek Menu
20 REM by Dzo Telfort
30 REM for B/B+/M/C/E
40 REM (c) Acorn User Sept 1987
50 :
60 MODE 0
70 PROCsetup:page=0
80 CLS
90 INPUT "Name of Restaurant; "N$
100 c=0
110 REPEAT:c=c+1
120 INPUT "Name of this course;     "c$
(c,0)
130 INPUT "English Equivalent;      "c$
(c,1)
140 INPUT "How many items;          "it
(c)
150 FOR loop%=1 TO it(c)
```

Continued ▶

◀ Joe's Jottings listing 3 continued

```
  160 PRINT c$(c,1); " Item "; loop%;
  170 INPUT " " it$(c,loop%,0)
  180 INPUT "English Equivalent;       " i
t$(c,loop%,1)
  190 NEXT
  200 PRINT "Another course; (Y/N)    ";
  210 REPEAT A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
  220 PRINT A$'
  230 UNTIL A$="N"
  240 INPUT "Set up your printer and pre
ss return " lp
  250 CLS
  260 PROCdouble(FNgreek(N$),-1,0,1,0):l
c=1
  270 FOR count= 1 TO c
  280 PROCcourse(count)
  290 NEXT
  300 PROCddump
  310 END
  320 :
  330 DEF PROCddump
  340 PRINT TAB(0,0) "Prt?"
  350 REPEAT:A$=CHR$(GET AND 223):UNTIL
A$="Y" OR A$="N"
  360 IF A$="N" ENDPROC
  370 PRINT TAB(0,0)"     "
  380 PROCdump
  390 ENDPROC
  400 :
  410 DEF PROCcourse(co)
  420 IF page=0 AND lc>=31 PROCddump:lc=
0:page=1:CLS
  430 IF page=1 AND lc>=12 PROCddump:lc=
0:page=0:CLS
  440 lc=lc+1
  450 PROCdouble(FNgreek(c$(co,0))+"....
"+c$(co,1),0,lc,1,0)
  460 IF page=0 AND lc>=31 PROCddump:lc=
0:page=1:CLS
  470 IF page=1 AND lc>=12 PROCddump:lc=
0:page=0:CLS
  480 lc=lc+2
  490 FOR item%=1 TO it(co)
  500 PRINT TAB(5,lc);FNgreek(it$(co,ite
m%,0));TAB(30,lc);it$(co,item%,1);
  510 lc=lc+2
  520 IF page=0 AND lc>=31 PROCddump:lc=
0:page=1:CLS
  530 IF page=1 AND lc>=12 PROCddump:lc=
0:page=0:CLS
  540 NEXT
  550 ENDPROC
  560 :
  570 DEF FNgreek(m$)
  580 LOCALloop%,g$,a$:g$=""
  590 FOR loop%= 1 TO LEN m$
  600 a$=MID$(m$,loop%,1)
  610 IF a$>="@" THEN g$=g$+CHR$(ASC(a$)
+128) ELSE g$=g$+a$
  620 NEXT
  630 =g$
  640 :
  650 DEF PROCsetup
  660 DIM it$(10,20,1)
  670 DIM c$(10,1)
  680 DIM it(10)
  690 VDU 23,192,0,0,63,96,96,62,3,62
  700 VDU 23,193,28,54,99,99,127,99,99,0
  710 VDU 23,194,126,51,51,62,51,51,126,
0
```

Continued ▶

◀ Joe's Jottings listing 3 continued

```
  720 VDU 23,195,62,99,99,127,99,99,62,0
  730 VDU 23,196,28,28,54,54,99,99,127,0
  740 VDU 23,197,127,51,48,62,48,51,127,
0
  750 VDU 23,198,62,8,62,107,62,8,62,0
  760 VDU 23,199,127,99,96,96,96,96,96,0
  770 VDU 23,200,99,99,54,28,54,99,99,0
  780 VDU 23,201,60,24,24,24,24,24,60,0
  790 VDU 23,202,119,51,51,63,51,51,119,
0
  800 VDU 23,203,99,102,108,120,108,102,
99,0
  810 VDU 23,204,28,28,54,54,99,99,99,0
  820 VDU 23,205,99,119,127,107,99,99,99
,0
  830 VDU 23,206,99,115,123,111,103,99,9
9,0
  840 VDU 23,207,62,99,99,99,99,99,62,0
  850 VDU 23,208,127,54,54,54,54,54,54,0
  860 VDU 23,209,62,8,107,107,62,8,62,0
  870 VDU 23,210,126,51,51,62,48,48,120,
0
  880 VDU 23,211,127,99,48,24,48,99,127,
0
  890 VDU 23,212,126,90,24,24,24,24,24,0
  900 VDU 23,213,102,102,102,60,24,24,60
,0
  910 VDU 23,214,102,102,102,60,24,24,60
,0
  920 VDU 23,215,62,99,99,99,54,54,99,0
  930 VDU 23,216,126,0,0,60,0,0,126,0
  940 VDU 23,217,127,99,96,96,96,96,96,0
  950 VDU 23,218,126,102,12,24,48,102,12
6,0
  960 VDU 23,219,124,96,96,96,96,96,124,
0
  970 VDU 23,220,0,96,48,24,12,6,0,0
  980 VDU 23,221,62,6,6,6,6,6,62,0
  990 VDU 23,222,24,60,102,66,0,0,0,0
 1000 VDU 23,223,0,0,0,0,0,0,0,255
 1010 VDU 23,224,28,54,48,124,48,48,126,
0
 1020 VDU 23,225,0,0,59,110,102,110,59,0
 1030 VDU 23,226,30,51,51,62,51,51,62,96
 1040 VDU 23,227,60,102,102,126,102,102,
60,0
 1050 VDU 23,228,60,96,48,60,102,102,60,
0
 1060 VDU 23,229,0,0,30,48,28,48,30,0
 1070 VDU 23,230,0,0,62,107,107,62,24,24
 1080 VDU 23,231,0,0,102,54,28,24,48,48
 1090 VDU 23,232,0,0,102,54,28,28,54,51
 1100 VDU 23,233,0,0,24,24,24,24,12,0
 1110 VDU 23,234,0,0,124,102,102,102,6,6
 1120 VDU 23,235,0,0,102,108,120,108,102
,0
 1130 VDU 23,236,96,48,24,28,54,99,99,0
 1140 VDU 23,237,0,0,51,51,51,51,62,96
 1150 VDU 23,238,0,0,99,51,27,30,28,0
 1160 VDU 23,239,0,0,62,99,99,99,62,0
 1170 VDU 23,240,0,0,127,54,54,54,54,0
 1180 VDU 23,241,0,0,99,107,107,62,24,24
 1190 VDU 23,242,0,0,60,102,102,124,96,9
6
 1200 VDU 23,243,0,0,63,102,102,102,60,0
 1210 VDU 23,244,0,0,126,24,24,24,12,0
 1220 VDU 23,245,0,0,115,51,51,51,30,0
 1230 VDU 23,246,0,0,115,51,51,51,30,0
 1240 VDU 23,247,0,0,54,99,107,127,54,0
 1250 VDU 23,248,60,96,96,60,96,96,62,6
 1260 VDU 23,249,0,0,102,54,28,24,48,48
 1270 VDU 23,250,62,12,24,48,96,96,62,6
 1280 VDU 23,251,12,24,24,112,24,24,12,0
```

Continued ▶

◀ Joe's Jottings listing 3 continued

```
1290 VDU 23,252,24,24,24,0,24,24,24,0
1300 VDU 23,253,48,24,24,14,24,24,48,0
1310 VDU 23,254,49,107,70,0,0,0,0,0
1320 ENDPROC
1330 :
1340 DEF PROCrect(x,y,l,w,f)
1350 MOVE x,y:DRAW x+l,y
1360 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
1370 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
1380 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
1390 ENDPROC
1400 :
1410 DEF PROCdouble(z$,x,y,f,b)
1420 COLOUR f:COLOUR b+128
1430 LOCAL c%
1440 c%=&70
1450 IF x<0 THEN PRINT TAB(40-LENz$ DIV
2,y);:ELSE PRINT TAB(x,y);
1460 FOR loop%=1 TO LENz$
1470 ?c%=ASC(MID$(z$,loop%,1))
1480 X%=c%MOD256
1490 Y%=c%DIV256
```

Continued ▶

◀ Joe's Jottings listing 3 continued

```
1500 A%=10
1510 CALL &FFF1
1520 VDU 23,128,c%?1,c%?1,c%?2,c%?2,c%?
3,c%?3,c%?4,c%?4,128,10,8,23,128,c%?5,c%
?5,c%?6,c%?6,c%?7,c%?7,c%?8,c%?8,128,11
1530 NEXT
1540 ENDPROC
1550 :
1560 DEF PROCdump
1570 MOVE 0,0:VDU 29,0;0;2,1,27,1,65,1,
8,1,10
1580 FORY%=1020TO12STEP-16
1590 VDU1,27,1,76,1,192,1,3
1600 FORX%=0TO1276STEP4
1610 A%=0:B%=0
1620 FORZ%=0TO12STEP4
1630 A%=A%*4+3*POINT(X%,Y%-Z%)
1640 B%=B%*4+3*POINT(X%+2,Y%-Z%)
1650 NEXT
1660 VDU1,A%,1,A%,1,B%
1670 NEXT
1680 VDU1,10
1690 NEXT
1700 VDU1,27,1,64,3
1710 ENDPROC
```

See Filling Out Files, page 87

Listing 1. DFS extension source code

```
   10 REM 128 File DFS E
xtension
   20 REM By David Lawre
nce
   30 REM For BBC B/B+/M
   40 REM (c) Acorn User
 Sept 1987
   50 :
   60 MODE 7
   70 PROCvars
   80 PROCassemble
   90 PROCchecksums
  100 PROCsave
  110 END
  120 :
  130 DEF PROCvars
  140 loc1=&70 : loc2=&7
1 : loc3=&72
  150 loc4=&73 : loc5=&7
4 : loc6=&75
  160 loc7=&76 : loc8=&7
7 : blk=&80
  170 buf1=&900 : buf2=&
A00
  180 osnewl=&FFE7
  190 osasci=&FFE3
  200 osword=&FFF1
  210 oswrch=&FFEE
  220 osbyte=&FFF4
  230 D%=&2000
  240 ENDPROC
  250 :
  260 DEF PROCassemble
  270 FOR I%=0 TO 2 STEP
 2
  280 P%=&6000
  290 [OPT I%
  300 .start
  310 OPT FNequb(0)
  320 OPT FNequb(0)
  330 OPT FNequb(0)
  340 JMP service+D%
  350 OPT FNequb(129)
  360 OPT FNequb(copy)
  370 OPT FNequb(1)
  380 .title
  390 OPT FNequb(13)
  400 OPT FNequs("128 fi
le DFS extension")
  410 OPT FNequb(13)
  420 OPT FNequb(0)
  430 OPT FNequs("1.00")
  440 .copy
  450 OPT FNequb(0)
  460 OPT FNequs("(C) Da
vid Lawrence 1986")
  470 OPT FNequb(0)
  480 .hlp
  490 OPT FNequs("128 fi
le DFS")
  500 OPT FNequb(13)
  510 OPT FNequb(13)
  520 OPT FNequs(" *LOG"
)
  530 OPT FNequb(13)
  540 OPT FNequs(" *PUT
file/*,<start,len>")
  550 OPT FNequb(13)
  560 OPT FNequs(" *GET
file/*")
  570 OPT FNequb(13)
  580 OPT FNequs(" *INIT
")
  590 OPT FNequb(13)
  600 OPT FNequs(" *ERAS
E")
  610 OPT FNequb(255)
  620 .service
  630 STA &8E
  640 TXA
  650 PHA
  660 TYA
  670 PHA
  680 LDA &8E
  690 CMP #4
  700 BEQ com
  710 CMP #9
  720 BEQ help
  730 JMP out+D%
  740 .help
  750 LDA (&F2),Y
  760 CMP #&D
  770 BEQ name
  780 LDX #0
  790 .help0
  800 LDA (&F2),Y
  810 CMP #&D
  820 BEQ help1
  830 CMP title+1+D%,X
  840 BNE out
  850 INY
  860 INX
  870 JMP help0+D%
  880 .help1
  890 JSR osnewl
  900 LDX #0
  910 .help2
  920 LDA hlp+D%,X
  930 CMP #&FF
  940 BEQ help3
  950 JSR osasci
  960 INX
  970 JMP help2+D%
  980 .help3
  990 JSR osnewl
 1000 JMP out+D%
 1010 .out
 1020 PLA
 1030 TAY
 1040 PLA
 1050 TAX
 1060 LDA &8E
 1070 RTS
 1080 .name
 1090 LDX #0
 1100 .name1
 1110 LDA title+D%,X
 1120 BEQ out
 1130 JSR osasci
 1140 INX
 1150 BNE name1
 1160 .com
 1170 STY loc5
 1180 LDY #4
 1190 .c1
 1200 LDA (&F2),Y
 1210 CMP cmd1+D%,Y
 1220 BNE next1
 1230 DEY
 1240 BNE c1
 1250 JMP dir+D%
 1260 .next1
 1270 LDY#4
 1280 .c2
 1290 LDA (&F2),Y
 1300 CMP cmd2+D%,Y
 1310 BNE next2
 1320 DEY
 1330 BNE c2
 1340 JMP get+D%
 1350 .next2
 1360 LDY #4
 1370 .c3
 1380 LDA (&F2),Y
 1390 CMP cmd3+D%,Y
 1400 BNE next3
 1410 DEY
 1420 BNE c3
 1430 JMP put+D%
 1440 .next3
 1450 LDY #5
 1460 .c4
 1470 LDA (&F2),Y
 1480 CMP cmd4+D%,Y
 1490 BNE next4
 1500 DEY
 1510 BNE c4
 1520 JMP init+D%
 1530 .next4
 1540 LDY #6
 1550 .c5
 1560 LDA (&F2),Y
 1570 CMP cmd5+D%,Y
 1580 BNE out
 1590 DEY
 1600 BNE c5
 1610 JMP erase+D%
 1620 .load
 1630 STA blk+2
 1640 STX blk+7
 1650 STY blk+8
 1660 LDX #blk MOD 256
 1670 LDY #blk DIV 256
 1680 LDA #&53
 1690 STA blk+6
 1700 LDA #&7F
```

Continued ▶

◀ Filling Out Files listing 1 continued

```
1710 JSR osword
1720 RTS
1730 .save
1740 STA blk+2
1750 STX blk+7
1760 STY blk+8
1770 LDX #blk MOD 256
1780 LDY #blk DIV 256
1790 LDA #&4B
1800 STA blk+6
1810 LDA #&7F
1820 JSR osword
1830 RTS
1840 .loadtrk
1850 STA blk+2
1860 STX blk+7
1870 LDA #0
1880 STA blk+8
1890 TYA
1900 CLC
1910 ADC #&20
1920 STA blk+9
1930 LDX #blk MOD 256
1940 LDY #blk DIV 256
1950 LDA #&53
1960 STA blk+6
1970 LDA #&7F
1980 JSR osword
1990 RTS
2000 LDA #&21
2010 STA blk+9
2020 RTS
2030 .savetrk
2040 STA blk+2
2050 STX blk+7
2060 LDA #0
2070 STA blk+8
2080 TYA
2090 CLC
2100 ADC #&20
2110 STA blk+9
2120 LDX #blk MOD 256
2130 LDY #blk DIV 256
2140 LDA #&4B
2150 STA blk+6
2160 LDA #&7F
2170 JSR osword
2180 LDA #&21
2190 STA blk+9
2200 RTS
2210 .setblk
2220 LDX #10
2230 .set1
2240 LDA blk1+D%,X
2250 STA blk,X
2260 DEX
2270 BPL set1
2280 LDX #0
2290 LDY #0
2300 LDA #&A
2310 JSR load+D%
2320 LDX #6
2330 .set2
2340 LDA buf2+&8,X
2350 CMP mess3+D%,X
2360 BNE wrong
2370 DEX
2380 BPL set2
2390 RTS
2400 .wrong
2410 LDX #err5 MOD 256
2420 LDY #(err5+D%) DIV 256
2430 JMP error+D%
2440 .blk1
2450 OPT FNequd(0)
2460 OPT FNequd(&300)
2470 OPT FNequd(&2100)
2480 .cmd1
2490 OPT FNequs(" LOG")
2500 OPT FNequb(13)
2510 .cmd2
2520 OPT FNequs(" GET ")
2530 .cmd3
2540 OPT FNequs(" PUT ")
2550 .cmd4
2560 OPT FNequs(" INIT")
2570 OPT FNequb(13)
2580 .cmd5
2590 OPT FNequs(" ERASE")
2600 OPT FNequb(13)
2610 .err1
2620 BRK
2630 OPT FNequb(255)
2640 OPT FNequs("File not found")
2650 OPT FNequb(0)
2660 .err2
2670 BRK
2680 OPT FNequb(254)
2690 OPT FNequs("Pardon?")
2700 OPT FNequb(0)
2710 .err3
2720 BRK
2730 OPT FNequb(253)
2740 OPT FNequs("Disk full")
2750 OPT FNequb(0)
2760 .err4
2770 BRK
2780 OPT FNequb(252)
2790 OPT FNequs("Cat full")
2800 OPT FNequb(0)
2810 .err5
2820 BRK
2830 OPT FNequb(251)
2840 OPT FNequs("Not 128 DFS disc")
2850 OPT FNequb(0)
2860 .err6
2870 BRK
2880 OPT FNequb(250)
2890 OPT FNequs("Catalog empty")
2900 OPT FNequb(0)
2910 .mess1
2920 OPT FNequs(" files . &")
2930 OPT FNequb(0)
2940 .mess2
2950 OPT FNequs(" free sectors")
2960 OPT FNequw(&D)
2970 .mess3
2980 OPT FNequs("128 DFS")
2990 .mess4
3000 OPT FNequs("0 track initialise -- Sure? (Y/N) :")
3010 OPT FNequw(7)
3020 .mess5 OPT FNequs(" -- Erase? (Y/N) :")
3030 OPT FNequw(7)
3040 .data1
3050 OPT FNequd(&20383231)
3060 OPT FNequd(&A4534644)
3070 .data2
3080 OPT FNequd(&00020001)
3090 OPT FNequd(&00850128)
3100 .data3
3110 OPT FNequd(&00020001)
3120 OPT FNequd(&00150350)
3130 .data4
3140 OPT FNequd(&0DF50128)
3150 OPT FNequd(&02301E00)
3160 .error
3170 STX loc4
3180 STY loc5
3190 LDY #1
3200 .error1
3210 LDA (loc4),Y
3220 STA &100,Y
3230 BEQ error2
3240 INY
3250 JMP error1+D%
3260 .error2
3270 LDA #0
3280 STA &100
3290 JMP &100
3300 .dir
3310 JSR setblk+D%
3320 LDA #0
3330 STA loc4
3340 STA loc5
3350 LDA #2
3360 STA loc2
3370 .dir1
3380 LDX #0
3390 LDY loc2
3400 LDA #&A
3410 JSR load+D%
3420 LDY #0
3430 .dir2
3440 LDA buf2,Y
3450 BEQ dirend
3460 SED
3470 LDA loc5
3480 CLC
3490 ADC #1
3500 STA loc5
3510 BCC miss
3520 INC loc4
3530 .miss
3540 CLD
3550 LDX #12
3560 .dir3
3570 LDA buf2,Y
3580 JSR oswrch
3590 INY
3600 DEX
3610 BNE dir3
3620 INY
3630 INY
3640 LDA #32
3650 JSR oswrch
3660 LDA buf2,Y
3670 JSR tohex+D%
3680 LDA #32
3690 JSR oswrch
3700 INY
3710 LDA buf2,Y
3720 JSR tohex+D%
3730 LDA #32
3740 JSR oswrch
3750 JSR oswrch
3760 INY
3770 CPY #0
3780 BNE dir2
3790 INC loc2
3800 LDA loc2
3810 CMP #10
3820 BNE dir1
3830 .dirend
3840 LDX #0
3850 LDY #0
3860 LDA #&A
3870 JSR load+D%
3880 JSR osnewl
3890 JSR osnewl
3900 LDA loc4
3910 BEQ dirend1
3920 LDA #49
3930 JSR oswrch
3940 JMP dirend2+D%
3950 .dirend1
3960 LDA #48
3970 JSR oswrch
3980 .dirend2
3990 LDA loc5
4000 JSR tohex+D%
4010 LDX #0
4020 .dirend3
4030 LDA mess1+D%,X
4040 BEQ dirend4
4050 JSR osasci
4060 INX
4070 JMP dirend3+D%
4080 .dirend4
4090 LDA buf2+&FD
4100 JSR tohex+D%
4110 LDA buf2+&FE
4120 JSR tohex+D%
4130 LDX #0
4140 .dirend5
4150 LDA mess2+D%,X
4160 BEQ dirend6
4170 JSR osasci
4180 INX
4190 JMP dirend5+D%
4200 .dirend6
4210 LDA #0
4220 STA &8E
4230 JMP out+D%
4240 .findname
4250 LDX #12
4260 LDA #32
4270 LDY #5
4280 .get1
4290 STA buf1,X
4300 DEX
4310 BNE get1
4320 LDX #0
4330 .get2
4340 LDA (&F2),Y
4350 CMP #&D
4360 BEQ get3
4370 STA buf1,X
4380 INY
4390 INX
4400 CPX #12
4410 BNE get2
4420 .get3
4430 LDA #2
4440 STA loc2
4450 .get4
4460 LDX #0
4470 LDY loc2
4480 LDA #&A
4490 JSR load+D%
4500 LDY #0
4510 LDX #15
4520 .move
4530 LDA buf2+&F0,X
4540 STA buf1+&F0,X
4550 DEX
4560 BPL move
4570 .get5
4580 LDA buf2,Y
4590 BEQ notfound
4600 LDX #0
4610 .get6
4620 LDA buf1,Y
4630 CMP #42
```

Continued ▶

◄ Filling Out Files listing 1 continued

```
4640 BEQ found
4650 CMP buf2,Y
4660 BNE get7
4670 INY
4680 INX
4690 CPX #12
4700 BEQ found
4710 JMP get6+D%
4720 .get7
4730 INY
4740 INX
4750 CPX #16
4760 BNE get7
4770 CPY #0
4780 BNE get5
4790 INC loc2
4800 LDA loc2
4810 CMP #10
4820 BNE get4
4830 .notfound
4840 LDX #err1 MOD 256
4850 LDY #(err1+D%) DIV
256
4860 JMP error+D%
4870 .found
4880 INY
4890 INX
4900 CPX #16
4910 BNE found
4920 RTS
4930 .get
4940 JSR setblk+D%
4950 JSR findname+D%
4960 STY loc7
4970 LDA buf1+&FC,Y
4980 STA loc1
4990 LDA buf1+&FD,Y
5000 STA loc2
5010 LDA buf1+&FE,Y
5020 STA loc3
5030 STA loc8
5040 LDA buf1+&FF,Y
5050 STA loc4
5060 CLC
5070 ADC loc3
5080 STA loc6
5090 .found1
5100 LDA loc2
5110 BNE load1
5120 LDY loc4
5130 CPY #11
5140 BCC ok
5150 LDY #10
5160 .ok
5170 STY loc5
5180 DEC loc5
5190 LDX loc1
5200 LDA loc3
5210 JSR loadtrk+D%
5220 LDA loc3
5230 CLC
5240 ADC loc5
5250 STA loc3
5260 LDA loc4
5270 SEC
5280 SBC loc5
5290 STA loc4
5300 LDA loc2
5310 CLC
5320 ADC loc5
5330 STA loc2
5340 JMP load2+D%
5350 .load1
5360 LDX loc1
5370 LDY loc2
5380 LDA loc3
5390 JSR load+D%
5400 .load2
5410 DEC loc4
5420 INC loc3
5430 LDA loc3
5440 CMP loc6
5450 BEQ found2
5460 INC loc2
5470 LDA loc2
5480 CMP #10
5490 BNE found1
5500 LDA #0
5510 STA loc2
5520 INC loc1
5530 JMP found1+D%
5540 .found2
5550 LDA loc7
5560 SEC
5570 SBC #16
5580 TAY
5590 LDA buf2,Y
5600 CMP #ASC"!"
5610 BNE found3
5620 LDA loc8
5630 STA &18
5640 LDA #138
5650 LDX #0
5660 LDY #ASC"O"
5670 JSR osbyte
5680 LDY #ASC"."
5690 JSR osbyte
5700 LDY #13
5710 JSR osbyte
5720 LDY #ASC"R"
5730 JSR osbyte
5740 LDY #ASC"U"
5750 JSR osbyte
5760 LDY #ASC"N"
5770 JSR osbyte
5780 LDY #13
5790 JSR osbyte
5800 .found3
5810 LDA #0
5820 STA &8E
5830 JMP out+D%
5840 .hex
5850 INY
5860 LDA (&F2),Y
5870 CMP #71
5880 BCS nohex
5890 CMP #48
5900 BCC nohex
5910 CMP #58
5920 BCC okhex1
5930 CMP #65
5940 BCS okhex2
5950 .nohex
5960 LDA #&FF
5970 RTS
5980 .okhex1
5990 SEC
6000 SBC #48
6010 RTS
6020 .okhex2
6030 SEC
6040 SBC #55
6050 RTS
6060 .tohex
6070 TAX
6080 LSR A
6090 LSR A
6100 LSR A
6110 LSR A
6120 JSR outhex+D%
6130 TXA
6140 AND #&F
6150 JSR outhex+D%
6160 RTS
6170 .outhex
6180 CMP #10
6190 BCS outhex2
6200 CLC
6210 ADC #48
6220 JSR oswrch
6230 RTS
6240 .outhex2
6250 CLC
6260 ADC #55
6270 JSR oswrch
6280 RTS
6290 .put
6300 JSR setblk+D%
6310 LDX #16
6320 LDA #32
6330 LDY #5
6340 .put1
6350 STA buf1,X
6360 DEX
6370 BNE put1
6380 LDX #0
6390 .put2
6400 LDA (&F2),Y
6410 CMP #13
6420 BEQ put4
6430 CMP #44
6440 BNE put3
6450 INX
6460 .put3
6470 INY
6480 JMP put2+D%
6490 .put4
6500 CPX #2
6510 BEQ put5
6520 CPX #0
6530 BNE wot
6540 JMP replace+D%
6550 .wot
6560 LDX #err2 MOD 256
6570 LDY #(err2+D%) DIV
256
6580 JMP error+D%
6590 .put5
6600 LDA #0
6610 STA loc7
6620 LDY #5
6630 LDX #0
6640 .put6
6650 LDA (&F2),Y
6660 CMP #44
6670 BEQ put8
6680 STA buf1,X
6690 INY
6700 INX
6710 CPX #12
6720 BNE put6
6730 .put7
6740 LDA (&F2),Y
6750 CMP #44
6760 BEQ put8
6770 INY
6780 JMP put7+D%
6790 .put8
6800 JSR hex+D%
6810 CMP #255
6820 BEQ wot
6830 ASL A
6840 ASL A
6850 ASL A
6860 ASL A
6870 STA loc6
6880 JSR hex+D%
6890 CMP #255
6900 BEQ wot
6910 CLC
6920 ADC loc6
6930 STA buf1+&E
6940 INY
6950 JSR hex+D%
6960 CMP #255
6970 BEQ wot
6980 ASL A
6990 ASL A
7000 ASL A
7010 ASL A
7020 STA loc6
7030 JSR hex+D%
7040 CMP #255
7050 BEQ wot
7060 CLC
7070 ADC loc6
7080 STA buf1+&F
7090 STA loc5
7100 CLC
7110 ADC buf1+&E
7120 STA loc1
7130 LDX #0
7140 LDY #0
7150 LDA #&A
7160 JSR load+D%
7170 LDA buf2+&FA
7180 CMP #10
7190 BEQ catfull
7200 LDA buf2+&F8
7210 STA buf1+&C
7220 LDA buf2+&F9
7230 STA buf1+&D
7240 LDA buf1+&E
7250 STA loc6
7260 DEC loc6
7270 .put9
7280 INC loc6
7290 LDA loc6
7300 CMP loc1
7310 BEQ put10
7320 LDA buf2+&F9
7330 BNE save1
7340 LDY loc5
7350 CPY #11
7360 BCC ok2
7370 LDY #10
7380 .ok2
7390 STY loc4
7400 DEC loc4
7410 LDX buf2+&F8
7420 LDA loc6
7430 JSR savetrk+D%
7440 LDA loc5
7450 SEC
7460 SBC loc4
7470 STA loc5
7480 LDA buf2+&F9
7490 CLC
7500 ADC loc4
7510 STA buf2+&F9
7520 LDA loc6
7530 CLC
7540 ADC loc4
7550 STA loc6
7560 JMP save2+D%
7570 .save1
7580 LDX buf2+&F8
7590 LDY buf2+&F9
7600 LDA loc6
7610 JSR save+D%
7620 .save2
7630 DEC loc5
7640 INC buf2+&F9
7650 LDA buf2+&F9
7660 CMP #10
7670 BNE put9
7680 LDA #0
7690 STA buf2+&F9
7700 INC buf2+&F8
7710 LDA buf2+&F8
7720 CMP buf2+&FC
7730 BNE put9
7740 .diskfull
7750 LDX #err3 MOD 256
7760 LDY #(err3+D%) DIV
256
7770 JMP error+D%
7780 .catfull
```

Continued ►

◀ Filling Out Files listing 1 continued

```
7790 LDX #err4 MOD 256
7800 LDY #(err4+D%) DIV
256
7810 JMP error+D%
7820 .put10
7830 LDA loc7
7840 CMP #1
7850 BEQ replaced
7860 LDA buf2+&FA
7870 STA loc2
7880 LDA buf2+&FB
7890 STA loc1
7900 CLC
7910 ADC #16
7920 STA buf2+&FB
7930 BNE put11
7940 INC buf2+&FA
7950 .put11
7960 LDA buf2+&FE
7970 SEC
7980 SBC buf1+&F
7990 STA buf2+&FE
8000 LDA buf2+&FD
8010 SBC #0
8020 STA buf2+&FD
8030 LDX #0
8040 LDY #0
8050 LDA #&A
8060 JSR save+D%
8070 LDX #0
8080 LDY loc2
8090 LDA #&A
8100 JSR load+D%
8110 LDY loc1
8120 LDX #0
8130 .put12
8140 LDA buf1,X
8150 STA buf2,Y
8160 INY
8170 INX
8180 CPX #16
8190 BNE put12
8200 LDX #0
8210 LDY loc2
8220 LDA #&A
8230 JSR save+D%
8240 .replaced
8250 LDA #0
8260 STA &8E
8270 JMP out+D%
8280 .replace
8290 JSR findname+D%
8300 LDA buf1+&FC,Y
8310 STA buf2+&F8
8320 LDA buf1+&FD,Y
8330 STA buf2+&F9
8340 LDA buf1+&FE,Y
8350 STA loc6
8360 LDA buf1+&FF,Y
8370 STA loc5
8380 CLC
8390 ADC loc6
8400 STA loc1
8410 DEC loc6
8420 LDA #1
8430 STA loc7
8440 JMP put9+D%
8450 JSR findname+D%
8460 .init
8470 LDX #10
8480 .sblk1
8490 LDA blk1+D%,X
8500 STA blk,X
8510 DEX
8520 BPL sblk1
8530 LDX #0
8540 LDY #1
8550 LDA #9
8560 JSR load+D%
8570 LDA buf1+&6
8580 ASL A
8590 CLC
8600 ADC #50
8610 TAY
8620 LDX #0
8630 TXA
8640 .clr
8650 STA buf1,X
8660 STA buf2,X
8670 INX
8680 BNE clr
8690 TYA
8700 CMP #52
8710 BEQ init40
8720 CMP #56
8730 BEQ init80
8740 JMP wot+D%
8750 .sure
8760 STX loc4
8770 STY loc5
8780 LDY #0
8790 .sure1
8800 LDA (loc4),Y
8810 BEQ sure2
8820 JSR osasci
8830 INY
8840 JMP sure1+D%
8850 .sure2
8860 LDA #15
8870 JSR osbyte
8880 LDX #&FF
8890 LDY #&7F
8900 LDA #&81
8910 JSR osbyte
8920 TXA
8930 CMP #ASC"N"
8940 BEQ sure3
8950 CMP #ASC"Y"
8960 BNE sure2
8970 JSR oswrch
8980 JSR osnewl
8990 RTS
9000 .sure3
9010 JSR oswrch
9020 JSR osnewl
9030 LDA #0
9040 STA &8E
9050 PLA
9060 PLA
9070 JMP out+D%
9080 .init40
9090 JSR oswrch
9100 LDX #mess4 MOD 256
9110 LDY #(mess4+D%) DI
V 256
9120 JSR sure+D%
9130 LDX #7
9140 .init401
9150 LDA data2+D%,X
9160 STA buf1+&F8,X
9170 DEX
9180 BPL init401
9190 LDA #1
9200 STA buf2+&6
9210 LDA #&90
9220 STA buf2+&7
9230 JMP init2+D%
9240 .init80
9250 JSR oswrch
9260 LDX #mess4 MOD 256
9270 LDY #(mess4+D%) DI
V 256
9280 JSR sure+D%
9290 LDX #7
9300 .init801
9310 LDA data3+D%,X
9320 STA buf1+&F8,X
9330 DEX
9340 BPL init801
9350 LDA #3
9360 STA buf2+&6
9370 LDA #&20
9380 STA buf2+&7
9390 .init2
9400 LDA #48
9410 JSR oswrch
9420 LDX #7
9430 .init3
9440 LDA data1+D%,X
9450 STA buf1+&8,X
9460 LDA data4+D%,X
9470 STA buf2+&8,X
9480 DEX
9490 BPL init3
9500 LDA #8
9510 STA buf2+&5
9520 LDX #4
9530 LDA #0
9540 .init4
9550 STA buf2,X
9560 DEX
9570 BPL init4
9580 LDX #0
9590 LDY #0
9600 LDA #9
9610 JSR save+D%
9620 LDA #49
9630 JSR oswrch
9640 LDX #0
9650 LDY #1
9660 LDA #&A
9670 JSR save+D%
9680 LDX #0
9690 TXA
9700 .init5
9710 STA buf1,X
9720 INX
9730 BNE init5
9740 LDY #2
9750 STY loc2
9760 .init6
9770 LDA loc2
9780 CLC
9790 ADC #48
9800 JSR oswrch
9810 LDX #0
9820 LDY loc2
9830 LDA #9
9840 JSR save+D%
9850 INC loc2
9860 LDA loc2
9870 CMP #10
9880 BNE init6
9890 JSR osnewl
9900 LDA #0
9910 STA &8E
9920 JMP out+D%
9930 .erase
9940 LDX #0
9950 LDY #0
9960 LDA #9
9970 JSR load+D%
9980 LDA buf1+&FB
9990 BNE erase1
10000 DEC buf1+&FA
10010 LDA buf1+&FA
10020 CMP #1
10030 BEQ erase4
10040 .erase1
10050 LDA buf1+&FB
10060 SEC
10070 SBC #16
10080 STA buf1+&FB
10090 LDX #0
10100 LDY buf1+&FA
10110 LDA #&A
10120 JSR load+D%
10130 LDY buf1+&FB
10140 LDX #12
10150 .erase2
10160 LDA buf2,Y
10170 JSR oswrch
10180 INY
10190 DEX
10200 BNE erase2
10210 LDX #mess5 MOD 256
10220 LDY #(mess5+D%) DI
V 256
10230 JSR sure+D%
10240 LDA buf1+&FB
10250 CLC
10260 ADC #&C
10270 TAY
10280 LDA buf2,Y
10290 STA buf1+&F8
10300 INY
10310 LDA buf2,Y
10320 STA buf1+&F9
10330 INY
10340 INY
10350 LDA buf2,Y
10360 STA loc6
10370 LDY buf1+&FB
10380 LDX #16
10390 LDA #0
10400 .erase3
10410 STA buf2,Y
10420 INY
10430 DEX
10440 BNE erase3
10450 LDA buf1+&FE
10460 CLC
10470 ADC loc6
10480 STA buf1+&FE
10490 LDA buf1+&FD
10500 ADC #0
10510 STA buf1+&FD
10520 LDX #0
10530 LDY #0
10540 LDA #9
10550 JSR save+D%
10560 LDX #0
10570 LDY buf1+&FA
10580 LDA #&A
10590 JSR save+D%
10600 LDA #0
10610 STA &8E
10620 JMP out+D%
10630 .erase4
10640 LDX #err6 MOD 256
10650 LDY #(err6+D%) DIV
256
10660 JMP error+D%
10670 .end
10680 BRK
10690 ]
10700 NEXT
10710 ENDPROC
10720 :
10730 DEF FNequb(b%)
10740 ?P%=b% : P%=P%+1
10750 = I%
10760 :
10770 DEF FNequw(b%)
10780 ?P%=b% MOD 256
10790 P%?1=b% DIV 256
10800 P%=P%+2
10810 = I%
10820 :
10830 DEF FNequd(b%)
10840 !P%=b% : P%=P%+4
10850 = I%
10860 :
10870 DEF FNequs(b$)
10880 $P%=b$ : P%=P%+LEN
(b$)
10890 = I%
```

Continued ▶

◀ Filling Out Files listing 1 continued

```
10900 :
10910 DEF PROCchecksums
10920 PROCcheck("start",
"com",22297)
10930 PROCcheck("com","s
etblk",25669)
10940 PROCcheck("setblk"
,"dir",23850)
10950 PROCcheck("dir","g
et3",27414)
10960 PROCcheck("get3","
found2",26061)
10970 PROCcheck("found2"
,"wot",20910)
10980 PROCcheck("wot","s
ave2",25331)
10990 PROCcheck("save2",
"sure",27644)
11000 PROCcheck("sure","
init6",24862)
11010 PROCcheck("init6",
"end",22802)
11020 ENDPROC
11030 :
11040 DEF PROCcheck(from
$,to$,value)
11050 total%=0
11060 FOR x%=EVAL(from$)
 TO EVAL(to$)
11070 total%=total%+?x%
11080 NEXT
11090 IF total%=value EN
DPROC
11100 PRINT"Checksum err
or between ";from$;" and
 ";to$;"."
11110 END
11120 :
11130 DEF PROCsave
11140 PRINT"Code assembl
ed OK."
11150 PRINT'"Insert the
disc on which you wish t
o   save the code and p
ress <SPACE>";
11160 REPEAT UNTIL INKEY
-99
11170 PRINT
11180 *SAVE R.ROM128 600
0 6900 8000 8000
11190 ENDPROC
```

See Get the Picture, page 95

Listing 1. Vertical compression program

```
 10 REM Vertical Compression Program
 20 REM by Phil Wilkes
 30 REM for B/E
 40 REM (c) Acorn User Sept 1987
 50 :
 60 MODE 2
 70 *LOAD P.1PIC 3000
 80 PROCratio(1.2)
 90 *SAVE P.1PIC2 3000 8000
100 END
110 :
120 DEF PROCratio(compress)
130 IF compress <=1 ENDPROC
140 LOCAL Y%,sy%
150 Y%=0
160 REPEAT
170 Y%=Y%+1
180 sy%=Y%*compress
190 IF sy%<256 THEN PROCline(sy%,Y%)
200 UNTIL sy%>255
210 FOR Y%=Y% TO 255
220 PROCblank(Y%)
230 NEXT
240 ENDPROC
250 :
260 DEF PROCline(sy%,dy%)
270 LOCAL S%,D%,X%
280 S%=&3000+640*(sy%DIV8)+sy%MOD8
290 D%=&3000+640*(dy%DIV8)+dy%MOD8
300 FOR X%=0 TO 632 STEP 8
310 X%?D%=X%?S%
320 NEXT
330 ENDPROC
340 :
350 DEF PROCblank(Y%)
360 LOCAL D%,X%
370 D%=&3000+640*(Y%DIV8)+Y%MOD8
380 FOR X%=0 TO 632 STEP 8
390 X%?D%=0
400 NEXT
410 ENDPROC
```

Listing 2. Legal compression program

Listed below are the changes to add to listing 1 to create the 'legal' version of the vertical compression routine

```
 10 REM Legal Compression Program
 30 REM for B/B+/M/C/2P/E
 40 REM (c) Acorn User Sept 1987
 65 mode%=2
 70 *LOAD P.1PIC FFFF3000
 90 *SAVE P.1PIC2 FFFF3000 +5000
```

Continued ▶

◀ Get the Picture listing 2 continued

```
270 LOCAL S%,D%,X%,P%
280 S%=1020-(4*sy%)
290 D%=1020-(4*dy%)
300 FOR X%=0 TO 1279 STEP 2^(mode%+1)
310 GCOL0,POINT(X%,S%):PLOT 69,X%,D%
360 LOCAL D%
370 GCOL 0,0
380 D%=1020-(4*Y%)
390 MOVE 0,D%:DRAW 1279,D%
```

Listing 3. Legal horizontal compression program

```
 10 REM Legal Horizontal Compression P
rogram
 20 REM by Phil Wilkes
 30 REM for B/B+/M/C/2P/E
 40 REM (c) Acorn User Sept 1987
 50 :
 60 MODE 1
 70 mode%=1
 80 *LOAD P.1PIC FFFF3000
 90 PROCratio(1.2)
100 *SAVE P.1PIC2 FFFF3000 +5000
110 END
120 :
130 DEF PROCratio(compress)
140 IF compress <=1 ENDPROC
150 LOCAL X%,sx%
160 X%=0
170 REPEAT
180 X%=X%+1
190 sx%=X%*compress
200 IF sx%<1280/2^(mode%+1) THEN PROCl
ine(sx%,X%)
210 UNTIL sx%>1280/2^(mode%+1)
220 FOR X%=X% TO 1280/2^(mode%+1)
230 PROCblank(X%)
240 NEXT
250 ENDPROC
260 :
270 DEF PROCline(sx%,dx%)
280 LOCAL S%,D%,Y%,P%
290 S%=1276-(2^(mode%+1)*sx%)
300 D%=1276-(2^(mode%+1)*dx%)
310 FOR Y%=0 TO 1023 STEP 4
320 GCOL0,POINT(S%,Y%)
330 PLOT 69,D%,Y%
340 NEXT
350 ENDPROC
360 :
370 DEF PROCblank(X%)
380 LOCAL D%
390 GCOL 0,0
400 D%=1280-X%*2^(mode%+1)
410 MOVE D%,0:DRAW D%,1023
420 ENDPROC
```

Listing 4. Effect code

```
   10 REM *Effect Code
   20 REM by Phil Wilkes
   30 REM for B/B+/M/C/E
   40 REM (c) Acorn User
 Sept 1986
   50 :
   60 IF PAGE<&1900 THEN
 PRINT "PAGE must be &19
00 or greater":END
   70 :
   80 xpoint=&70
   90 ypoint=&72
  100 point=&74
  110 arraypoint=&75
  120 p0=&77
  130 p1=&78
  140 p2=&79
  150 p3=&7A
  160 mode=&7B
  170 effect=&7C
  180 threshold=&7D
  190 step=&7E
  200 bright=&80
  210 logic=&88
  220 bx=&1600
  230 oswrch=&FFEE
  240 osword=&FFF1
  250 :
  260 FOR pass=0 TO 3 ST
EP 3
  270 P%=&1400
  280 [
  290 OPT pass
  300 .entry
  310 STA mode
  320 STX effect
  330 CPX #1
  340 BNE setup2
  350 STY threshold
  360 JMP main
  370 .setup2
  380 TYA
  390 BNE t2
  400 LDA #1
  410 STA threshold
  420 JMP main
  430 .t2
  440 LDA #2
  450 STA threshold
  460 .main
  470 LDA #1
  480 LDX mode
  490 .steploop
  500 ASL A
  510 DEX
  520 BPL steploop
  530 STA step
  540 JSR brightness
  550 JSR firstline
  560 JSR process
  570 LDA effect
  580 CMP #1
  590 BNE e2
  600 LDA #7
  610 JSR gcol
  620 JMP border
  630 .e2
  640 LDA #0
  650 JSR gcol
  660 .border
  670 LDX #0
  680 .bordloop
```

Continued ►

◄ Get the Picture listing 4 continued

```
  690 LDA bordata,X
  700 JSR oswrch
  710 INX
  720 CPX #18
  730 BNE bordloop
  740 RTS
  750 :
  760 .bordata
  770 OPT FNequb (25)
  780 OPT FNequb (4)
  790 OPT FNequw (0)
  800 OPT FNequw (1023)
  810 OPT FNequb (25)
  820 OPT FNequb (5)
  830 OPT FNequw (1279)
  840 OPT FNequw (1023)
  850 OPT FNequb (25)
  860 OPT FNequb (5)
  870 OPT FNequw (1279)
  880 OPT FNequw (0)
  890 :
  900 .gcol
  910 PHA
  920 LDA #18
  930 JSR oswrch
  940 LDA #0
  950 JSR oswrch
  960 PLA
  970 JMP oswrch
  980 :
  990 .brightness
 1000 LDX #0
 1010 LDA mode
 1020 CMP #2
 1030 BEQ bright2
 1040 .bloop
 1050 TXA
 1060 STA bright,X
 1070 INX
 1080 CPX #4
 1090 BNE bloop
 1100 LDX #0
 1110 .lloop
 1120 TXA
 1130 STA logic,X
 1140 INX
 1150 CPX #4
 1160 BNE lloop
 1170 RTS
 1180 .bright2
 1190 LDA b2data,X
 1200 STA bright,X
 1210 INX
 1220 CPX #16
 1230 BNE bright2
 1240 RTS
 1250 :
 1260 .b2data
 1270 OPT FNequb (0)
 1280 OPT FNequb (2)
 1290 OPT FNequb (4)
 1300 OPT FNequb (6)
 1310 OPT FNequb (1)
 1320 OPT FNequb (3)
 1330 OPT FNequb (5)
 1340 OPT FNequb (7)
 1350 OPT FNequb (0)
 1360 OPT FNequb (4)
 1370 OPT FNequb (1)
 1380 OPT FNequb (5)
 1390 OPT FNequb (2)
 1400 OPT FNequb (6)
```

Continued ►

◄ Get the Picture listing 4 continued

```
 1410 OPT FNequb (3)
 1420 OPT FNequb (7)
 1430 :
 1440 .firstline
 1450 LDA #0
 1460 STA xpoint
 1470 STA xpoint+1
 1480 STA ypoint
 1490 STA ypoint+1
 1500 LDA #(bx MOD 256)
 1510 STA arraypoint
 1520 LDA #(bx DIV 256)
 1530 STA arraypoint+1
 1540 .firstloop
 1550 JSR testpoint
 1560 LDX #0
 1570 STA (arraypoint,X)
 1580 LDA xpoint
 1590 CLC
 1600 ADC step
 1610 STA xpoint
 1620 BCC over
 1630 INC xpoint+1
 1640 LDA xpoint+1
 1650 CMP #5
 1660 BNE over
 1670 RTS
 1680 .over
 1690 INC arraypoint
 1700 BNE firstloop
 1710 INC arraypoint+1
 1720 BPL firstloop
 1730 :
 1740 .testpoint
 1750 LDA #9
 1760 LDX #(xpoint MOD 2
56)
 1770 LDY #(xpoint DIV 2
56)
 1780 JSR osword
 1790 LDX point
 1800 LDA bright,X
 1810 RTS
 1820 :
 1830 .process
 1840 LDA #0
 1850 STA ypoint+1
 1860 LDA #4
 1870 STA ypoint
 1880 .yloop
 1890 LDA bx
 1900 STA p0
 1910 LDA #0
 1920 STA xpoint
 1930 STA xpoint+1
 1940 JSR testpoint
 1950 STA p1
 1960 LDA step
 1970 STA xpoint
 1980 LDA #(bx MOD 256)
 1990 STA arraypoint
 2000 LDA #(bx DIV 256)
 2010 STA arraypoint+1
 2020 .xloop
 2030 LDY #1
 2040 LDA (arraypoint),Y
 2050 STA p2
 2060 JSR testpoint
 2070 STA p3
 2080 LDA effect
 2090 CMP #1
 2100 BNE notedge
```

Continued ►

◀ **Get the Picture listing 4 continued**

```
2110 JSR edge
2120 JMP continue
2130 .notedge
2140 JSR pixav
2150 .continue
2160 JSR plot
2170 LDY #0
2180 LDA p1
2190 STA (arraypoint),Y
2200 LDA p2
2210 STA p0
2220 LDA p3
2230 STA p1
2240 INC arraypoint
2250 BNE noinc
2260 INC arraypoint+1
2270 .noinc
2280 LDA xpoint
2290 CLC
2300 ADC step
2310 STA xpoint
2320 BCC xloop
2330 INC xpoint+1
2340 LDA xpoint+1
2350 CMP #5
2360 BNE xloop
2370 LDY #0
2380 LDA p3
2390 STA (arraypoint),Y
2400 LDA ypoint
2410 CLC
2420 ADC #4
2430 STA ypoint
2440 BCC yloop
2450 INC ypoint+1
2460 LDA ypoint+1
2470 CMP #4
2480 BNE yloop
2490 RTS
2500 :
2510 .plot
2520 LDA #25
2530 JSR oswrch
2540 LDA #69
2550 JSR oswrch
2560 LDA xpoint
2570 SEC
2580 SBC step
2590 PHP
2600 JSR oswrch
2610 PLP
2620 LDA xpoint+1
2630 SBC #0
2640 JSR oswrch
2650 LDA ypoint
2660 SEC
2670 SBC #4
2680 PHP
2690 JSR oswrch
2700 PLP
2710 LDA ypoint+1
2720 SBC #0
2730 JMP oswrch
2740 :
2750 .edge
2760 LDA #7
2770 JSR gcol
2780 LDX #3
2790 .edgeloop
2800 LDA p0,X
2810 SEC
2820 SBC p0
2830 BPL notneg
```

Continued ▶

◀ **Get the Picture listing 4 continued**

```
2840 EOR #&FF
2850 ADC #1
2860 .notneg
2870 SEC:SBC threshold
2880 BPL found
2890 DEX
2900 BNE edgeloop
2910 RTS
2920 .found
2930 LDA #0
2940 JMP gcol
2950 :
2960 .pixav
2970 LDA p0
2980 CLC
2990 ADC p1
3000 ADC p2
3010 ADC p3
3020 ADC threshold
3030 LSR A
3040 LSR A
3050 TAX
3060 LDA logic,X
3070 JMP gcol
3080 ]
3090 NEXT pass
3100 :
3110 sum%=0
3120 FOR I%=&1400 TO &1
5C3
3130 sum%=sum%+?I%
3140 NEXT
3150 IF sum%<>&C55A PRI
NT "Checksum error - ple
ase check listing":END
3160 :
3170 *SAVE 0.EFFECT 140
0 15FF
3180 END
3190 :
3200 DEF FNequb (n)
3210 ?P%=n
3220 P%=P%+1
3230 =pass
3240 :
3250 DEF FNequw (n)
3260 !P%=n
3270 P%=P%+2
3280 =pass
```

Listing 5. Picture processing demonstration

```
10 REM Picture Proces
sing Demonstration
20 REM by Phil Wilkes
30 REM for B/B+/M/C/E
40 REM (C) Acorn User
Sept 1987
50 :
60 IF PAGE<&1900 THEN
PRINT "PAGE must be &19
00 or greater":END
70 :
80 MODE 2
90 FOR C%=1 TO 3
100 GCOL 0,C%+3
110 PROCdisk(500-(100*
C%))
120 GCOL 0,C%
130 PROCdisk(450-(100*
C%))
```

Continued ▶

◀ **Get the Picture listing 5 continued**

```
140 NEXT
150 GCOL 0,7
160 PROCdisk(100)
170 GCOL 0,0
180 FOR X%=0 TO 80 STE
P 8
190 MOVE X%,0:DRAW 127
9-X%,1023
200 MOVE 1279-X%,0:DRA
W X%,1023
210 NEXT
220 GCOL 0,7
230 FOR X%=540 TO 740
STEP 20
240 MOVE X%,0:DRAW 127
9-X%,1023
250 NEXT
260 FOR Y%=412 TO 612
STEP 20
270 MOVE 0,Y%:DRAW 127
9,1023-Y%
280 NEXT
290 PROCeffect(2,2,1)
300 PROCeffect(2,1,1)
310 END
320 :
330 DEF PROCdisk(R%)
340 LOCAL A%
350 MOVE 640,512+R%
360 FOR A%=10 TO 360 S
TEP 10
370 MOVE 640,512
380 PLOT 85,640+R%*SIN
(RAD(A%)),512+R%*COS(RAD
(A%))
390 NEXT
400 ENDPROC
410 :
420 DEF PROCeffect(M%,
E%,T%)
430 LOCAL A%,X%,Y%
440 *LOAD 0.EFFECT 140
0
450 A%=M%
460 X%=E%
470 Y%=T%
480 CALL &1400
490 ENDPROC
```

September listings

The easiest way to enter the listings is to buy the monthly listings disc or cassette. It saves time and removes the inevitable typing errors. The disc is fully menu driven and an excellent buy at only £5.95. The listings can be downloaded from Micronet page 600 600 890A, price £5. The cassette version costs just £3.95.

Remember there is a graphics bonus on the disc and cassette each month to add to your graphics library. The order form is on page 121, opposite.

A set of checksums is available free of charge for all the yellow page programs. Send a large stamped self-addressed envelope (26p stamp) to AU Checksums, PO Box 641, London NW9 8TE.

ACORN USER ORDER FORM

ACORN USER OFFERS

DISC SUBSCRIPTIONS

Yes! Please send me my free disc binder and start my disc subscription from the ________________ issue

01 UK (six months only*)	☐ £30.00
01 UK	☐ £69.00
02 EUROPE (Airmail)	☐ £76.00
02 OVERSEAS (Surface)	☐ £76.00
03 OVERSEAS (Airmail)	☐ £84.00

TOTAL VALUE £ ________

* Disc binder not included

CASSETTE SUBSCRIPTIONS

Yes! Please start my cassette subscription from the ________ issue and send me my free games cassette

01 UK (six months only*)	☐ £20.00
01 UK	☐ £45.00
02 EUROPE (Airmail)	☐ £52.00
02 OVERSEAS (Surface)	☐ £52.00
03 OVERSEAS (Airmail)	☐ £62.00

TOTAL VALUE £ ________

* Games Compendium not included

MAGAZINE SUBSCRIPTIONS

Yes! Please start my subscription to Acorn User magazine from the ________________ Issue (UK Subscribers see page 86 before completing)

	12 Issues	27 Issues
01 UK	☐ £17.50	☐ £35.00
02 EUROPE	☐ £25.00	☐ £50.00
03 MIDDLE EAST	☐ £30.00	☐ £60.00
04 THE AMERICAS & AFRICA	☐ £35.00	☐ £70.00
05 REST OF THE WORLD	☐ £40.00	☐ £80.00

TOTAL VALUE £ ________

ACORN USER MONTHLY DISCS

1986	1986	1987
☐ JAN 0204-6	☐ AUG 0211-9	☐ JAN 0216-X
☐ FEB 0205-4	☐ SEP 0212-7	☐ FEB 0217-8
☐ MAR 0206-2	☐ OCT 0213-5	☐ MAR 0218-6
☐ APR 0207-0	☐ NOV 0214-3	☐ APR 0219-4
☐ MAY 0208-9	☐ DEC 0215-1	☐ MAY 0220-8
☐ JUN 0209-7		☐ JUN 0221-6
☐ JUL 0210-0		☐ JUL 0222-4
		☐ AUG 0223-2
		☐ SEP 0224-0

UK=£5.95
Europe=£6.95
Overseas=£7.95

All *AU* discs are in DFS format for the 1770 and 8271 systems. Monthly discs are 5.25-inch (40-track with 80-track transfer program supplied)

TOTAL VALUE £ ________

ACORN USER MONTHLY CASSETTES

1985	1986	1987
☐ JAN 0409-X	☐ JAN 0421-9	☐ JAN 0433-2
☐ FEB 0410-3	☐ FEB 0422-7	☐ FEB 0434-0
☐ MAR 0411-1	☐ MAR 0423-5	☐ MAR 0435-9
☐ APR 0412-X	☐ APR 0424-3	☐ APR 0436-7
☐ MAY 0413-8	☐ MAY 0425-1	☐ MAY 0437-5
☐ JUN 0414-6	☐ JUN 0426-X	☐ JUN 0438-3
☐ JUL 0415-4	☐ JUL 0427-8	☐ JUL 0439-1
☐ AUG 0416-2	☐ AUG 0428-6	☐ AUG 0440-5
☐ SEP 0417-0	☐ SEP 0429-4	☐ SEP 0441-3
☐ OCT 0418-9	☐ OCT 0430-8	UK= £3.95
☐ NOV 0419-7	☐ NOV 0431-6	Europe= £4.95
☐ DEC 0420-0	☐ DEC 0432-4	Overseas= £5.95

Monthly cassettes are suitable for BBC micro and Electron users

TOTAL VALUE £ ________

ACORN USER MAGAZINE BACK ISSUES

1985	1986	1987
☐ JAN 0021-3	☐ JAN 0032-9	☐ JAN 0044-2
☐ MAR 0022-1	☐ FEB 0033-7	☐ MAR 0046-9
☐ APR 0023-X	☐ MAR 0034-5	☐ APR 0047-7
☐ MAY 0024-8	☐ APR 0035-3	☐ MAY 0048-5
☐ JUN 0025-6	☐ MAY 0036-1	☐ JUN 0049-3
☐ JUL 0026-4	☐ JUN 0037-X	☐ JUL 0050-7
☐ AUG 0027-2	☐ JUL 0038-8	☐ AUG 0051-5
☐ SEP 0028-0	☐ AUG 0039-6	☐ SEP 0052-3
☐ OCT 0029-9	☐ SEP 0040-X	
☐ NOV 0030-2	☐ OCT 0041-8	UK= £1.75
☐ DEC 0031-0	☐ NOV 0042-6	Europe= £2.25
	☐ DEC 0043-4	Overseas= £3.75

TOTAL VALUE £ ________

BINDERS

TOTAL VALUE £ ________

		UK	EUROPE	OVERSEAS
MAGAZINE BINDER	1201-7	☐ £4.95	☐ £7.95	☐ £14.95
DISC BINDER	1302-1	☐ £6.95	☐ £9.95	☐ £16.95

24 hours telephone service (0672) 40825

ACORN USER ORDER FORM

ACORN USER OFFERS

ACORN USER ROMS

☐ USERDUMP 1001-4
☐ USERROM 1002-2
☐ AXRROM 1003-0

UK = £19.95
Europe = £20.95
Overseas = £21.95

TOTAL VALUE £______

ACORN USER SPECIAL CASSETTES

☐ ACORN USER GRAPHICS 0601-7
☐ BEST OF ACORN USER 0602-5
☐ GAMES COMPENDIUM 0603-3
☐ FINEST FAVOURITES 0604-1

UK = £3.95
Europe = £4.95
Overseas = £5.95

TOTAL VALUE £______

ACORN USER SPECIAL DISCS

GALLERY DISC
40-track 0801-X ☐ 80-track 0802-8 ☐ 3.5in 0803-6 ☐

GALLERY COLLECTION DISC
40-track 0840-0 ☐ 80-track 0841-9 ☐ 3.5in 0842-7 ☐

DISC HELP DISC
80-track 0804-4 ☐ Europe = £7.95 UK = £6.95 Overseas = £8.95

PRINTER HELP DISC
40-track 0820-6 ☐ 80-track 0821-4 ☐

GRAPHICS UTILITIES DISC
40-track 0830-3 ☐

EDUCATION DISC
40-track 0815-X ☐

UK = £7.95
Europe = £8.95
Overseas = £9.95

TOTAL VALUE £______

SIDEWAYS RAM UTILITIES DISC
40-track 0825-7 ☐
UK = £9.95
Europe = £10.95 Overseas = £11.95

NETWORK UTILITIES DISC
80-track 0809-5 ☐
UK = £19.95
Europe = £20.95 Overseas = £21.95

CALLIGRAPHY
40/80-track 0950-4 ☐
UK = £9.95
Europe = £10.95 Overseas = £11.95

VIEWCHART DISC
40-track 0920-2 ☐
UK = £12.95 Europe = £13.95 Overseas = £14.95

☐ I enclose a sterling cheque/postal order for a total of £______ made payable to **Redwood Publishing**

☐ Please debit my ☐ Visa (Barclaycard) ☐ Access (Mastercard)

Credit card number ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ Expiry date ☐☐☐☐

SIGNED ______ DATE ______

MR/MRS/MISS/MS ______ INITIALS ______ SURNAME ______

ADDRESS ______

______

POSTCODE ______ TELEPHONE ______

Please return your order to: Redwood Publishing Ltd, *Acorn User* Mail Order, Lambourn Woodlands, Newbury Berkshire RG16 7TW

For Office Use Only

0 0 ☐☐ ☐ ☐☐☐☐☐

2 0 0 1 X 1 3 2 N Y D P

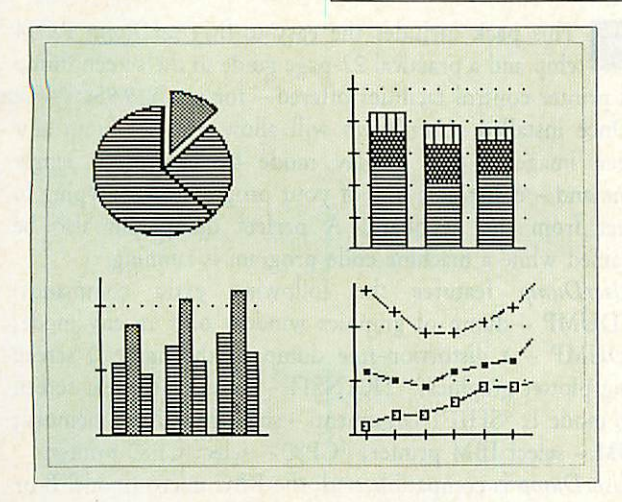
B41

B41

24 hour telephone service (0672) 40825

OFFERS

C H A R T S O F T W A R E



Improve your presentation with ViewChart

BBC/B/ B+/M/ C

Do you use your micro to prepare figures? Perhaps in *ViewSheet* or *ViewStore*? Do you make printed reports? This business graphics program from *Acorn User* contributor Peter Sandford is aimed at anyone who uses figures, and wishes to improve the quality of their work.

ViewChart takes your numeric data from a *ViewSheet* or *ViewStore* file, or manual input, and plots various chart formats to screen. In one plot you can produce between one and five piecharts, stacked bar charts up to 25 bars, grouped bar charts up to 24 bars and line graphs with up to five lines each of 40 plotted points.

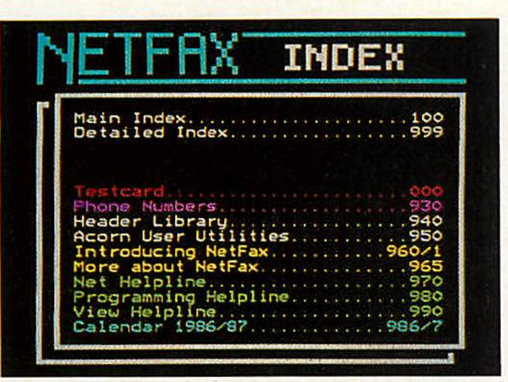
In practice, most business presentation data such as sales figures, departmental breakdowns, cost analyses and so on can be presented in a form even the boss will understand!

You can even add extra text and graphics to the completed chart prior to saving or printing. A screen dump program is provided, for Epson and compatible printers, which is specifically designed to fit the width of an A4 page. Instructions are provided on interfacing to other printers. *ViewChart* works in screen mode 0, using full shading effects, so what you see on screen is what you get on paper, and includes some tips on final presentation of graphics in documents.

ViewChart is supplied on 40-track 5.25-inch disc and works on the BBC models B and B+ and Master 128.

And the price of this professional software? Just £12.95.

D I S C S



Network utilities for better communication

BBC/B/ B+/M/ C

The *Network Utilities* 80-track disc is the logical addition to your network, combining invaluable routines with a sophisticated yet easy-to-use noticeboard.

Included is *Netfax*, our own hybrid information system providing access to thousands of pages of information. Other special features are: a file locator and directory size finder; network manager utilities including a bridge compatible screen viewer and a 'notify all' facility.

Plus there are 150 *Netfax* pages covering instructions, help and indexes, all on a 5.25-inch disc for £19.95.

D I S C S



Disc for all sideways RAM users

BBC/B/ B+/M/ C

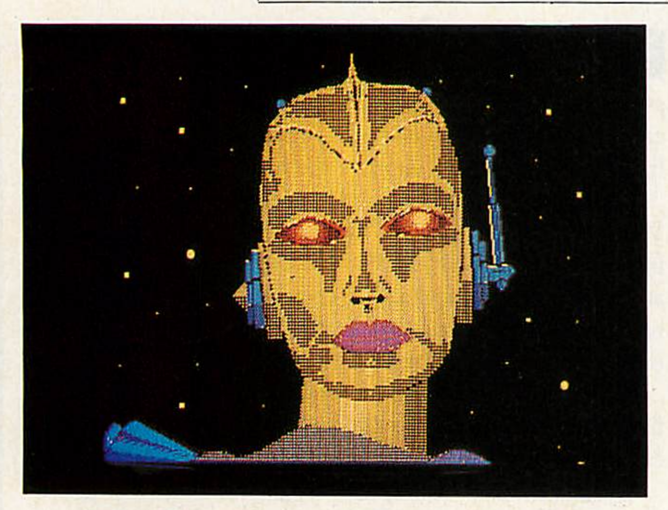
The *Sideways RAM Utilities* disc includes: *Ram-Pad* – your computer's answer to the pad and pen. *On-Screen Fonts* – a variety of print styles available in all graphics modes. * HLP ROM – add your own help text to call up when you're stuck. Standard ROM header for use when writing your own ROMs. * RLOOK to examine the contents of your ROMs and sideways RAM images.

There are many more utilities on this 40-track 5.25-inch disc with a transfer program for 80-track users, and it's competitively priced at £9.95.

Acorn User order form on page 122 – 24 hour telephone service (0672) 40825

OFFERS

D U M P R O M S



Printer control with the UserDump ROM

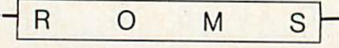
BBC/B/B+/M/C/E This pack includes the easy-to-fit *UserDump* ROM chip and a practical 22-page guide to the screen dump and printer control facilities offered – for just £19.95.

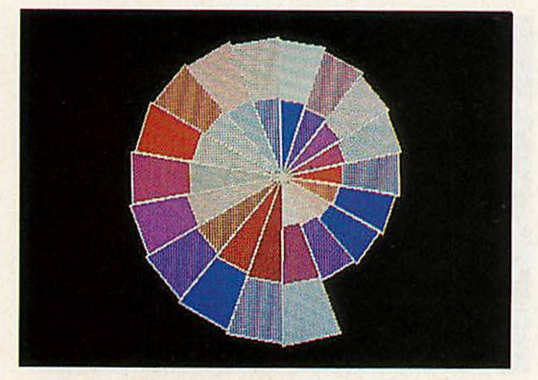
Once installed, *UserDump* will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing in direct from the keyboard. A perfect dump can also be obtained while a machine code program is running.

UserDump features the following extra commands: *WDUMP – dump of graphics window only in any mode; *ZDUMP – a distortion-free dump of the mode 0 screen using plotter graphics; *TRANSIT – translate teletext screen into mode 1; *SHIFT ‹argument› – shift any area of memory; *IBM – select IBM printer; *CP80 – select CP80 printer.

UserDump is compatible with the BBC micro (model B or B+) fitted with operating system 1.2. Any earlier version will cause problems. *UserDump* is fully compatible with the Acorn 6502 second processor. It works with any printer which has single density and double density bit image graphics, including all Epson (LX, RX and FX) printers, Star Gemini and Delta, SG, SD and SR, Canon and Kaga NLQ. Also usable are the Shinwa and other CP80 printers.

There are many more commands available with *UserDump*, and details are available from Seran, Redwood Publishing Ltd., 141-143 Drury Lane, London WC2B 5TF.





Your favourite Acorn User routines

BBC/B/B+/M/C/E Get *UserROM* for your favourite *Acorn User* routines. Plug in the ROM chip and 19 routines are instantly accessible via star commands, including colfill with 27 colourful fills; dotfill providing 23 new black and white shades; bad program recovery; variable lister; function key lister; a graphics compiler; a circle drawing routine and a sound compiler. There are many demonstration programs and a 22 page manual. All for £19.95.

Full details are available from Seran, Redwood Publishing Ltd., 141-143 Drury Lane, London WC2B 5TF.

R O M S

```
Assembler Extension ROM (AXR) 1.10
 BITS  (Use *BITS for help on OPT)
 ASSM <src> <OPT 1> (<OPT 2>) (<dest>)
 DSM (<address>) (<ROM>)
 LVAR
 STRIP <fsp> (<:>)
 FX 104,0,0 to disable
 Condition: On
```

Acorn User Assembler Extension ROM

BBC/B/B+/M/E The *AXR* ROM, competitively priced at £19.95, is especially designed for use by machine code programmers. *AXR* adds a variety of options and commands to the Basic assembler, along with several new pseudo op codes, full Basic expression evaluation, and even the use of binary numbers. A disassembler is included in the software, and all 65C02 instructions can be used. *AXR* is compatible with Basic 1, 2 and Master.

Further details from Seran, Redwood Publishing Ltd., 141-143 Drury Lane, London WC2B 5TF.

Acorn User order form on page 123 – 24 hour telephone service (0672) 40825

OFFERS

PROGRAM LISTINGS



Programs to process your pictures

Utilise your disc space more efficiently with Dave Lawrence's *128 DFS* program. You can now increase the catalogue entries on any disc by over four times. This program allows you to store 128 files on your disc instead of the usual 31!

With your summer holiday approaching rapidly, you have probably packed the sun screen and the swimming trunks but what about the language barrier? Joe thought that all readers going to the Greek islands should at least have a smattering of the lingo. So Joe's Jottings for September is a Greek tutorial program. Use this program for a few weeks before you go and you could be ordering Retsina in tavernas like a native.

Phil Wilkes has put together a suite of digital image processing programs, which allow you to enhance all digitised pictures. And this month's Graphics Bonus is a digitised picture for you to use with this program. There are many more digitised pictures on the Gallery and Gallery Collection discs for you to enhance, and both discs are still available.

For beginners, Tessie Revivis describes how to call up machine code routines from Basic. Martin Phillips covers a few tips on numerical accuracy, proportional screen dumps and sideways RAM loaders. While David Atherton gives you a *FIND utility for the ADFS which allows you to find a file anywhere on the disc, whatever directory it is in.

September's listings are available in 5.25-inch 40/80-track format or on cassette for the BBC and Electron.

LISTINGS

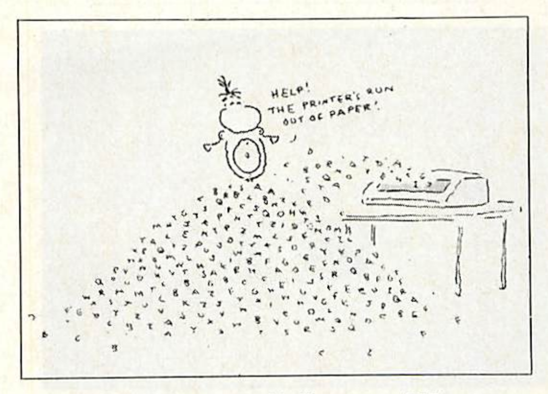


Easy learning with Education disc

The *Acorn User* Education disc makes learning easy and enjoyable. The disc is packed with useful programs, including *Eco-fax*, the viewdata-type database for Econets.

Graphics are a strong feature, and included on the disc are *Turtle Logo, Easyplot* and *Bulletin*, and you can then show off your creations with *Vufoil* and *Noticeboard* or make music with *Tunemaker*. Also included are an all-mode dumping routine for Epson compatibles and a teletext dumping routine for mode 7 dumping to Epson FX80 compatibles. All this for only £7.95.

DISCS



Printer advice with Printer Help disc

BBC/B/B+/M/C

Often printer manuals don't fully cover the Master and BBC micro – our disc will help you to understand your printer's facilities for just £7.95.

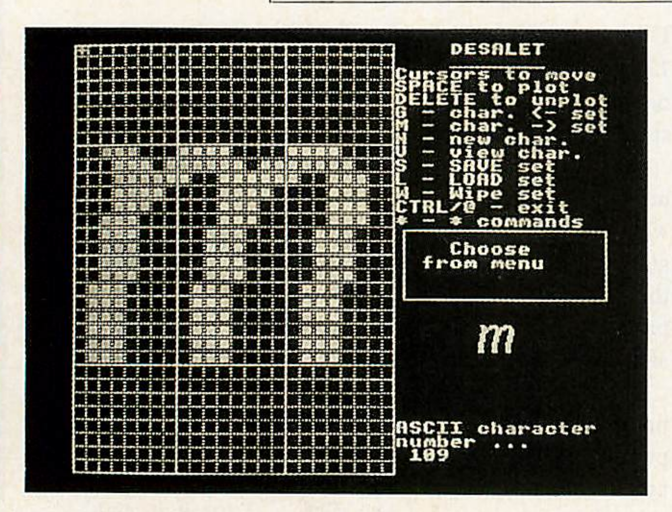
The 5.25-inch *Printer Help* disc illustrates various print type styles, use of *Wordwise* and *View*, screen images and printer care. There is an ASCII standard codes table and clear diagrams illustrating stages of printer use including advice on what to do if things go wrong.

For compatibility details write to Seran, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.

Acorn User **order form on page 121 – 24 hour telephone service (0672) 40825**

OFFERS

C A L L I G R A P H Y



A new dimension in letter designing

BBC/B/B+/M/ This is your chance to produce your own letterheads and posters to a professional standard, with the minimum of fuss and effort. *Acorn User's Calligraphy* disc has been compiled due to popular demand and contains all the programs needed to produce letter designs that will impress your friends and colleagues.

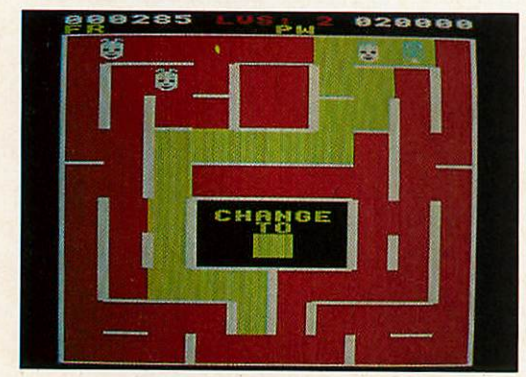
The *Desalet* program is a simple font creator which produces customised letters, to your personal design. It will save you from using repetitive data statements and error prone calculations. You can save your font set on disc and then call it up as needed. All previously saved sets can be modified or added to, and each set covers up to 94 characters.

Modical, a modification of the original *Calligraphy* program (September 1986 *Acorn User*) is also included on the disc. *Modical* allows the use of disc-based font sets created with *Desalet*. *Modical* also incorporates a modified file creation program, which permits files to be printed out immediately or saved for later printing.

An enhanced font ROM in the form of a sideways RAM image, is also on the disc. This allows you to design your own fonts for use on-screen. Any output to the printer will be in the new font – thus giving true WYSIWYG capabilities. There is a selection of new fonts to help you get started.

This superb disc comes in 5.25-inch, 40-track format easily transferable to 80-track and is great value at only £9.95.

C A S S E T T E S



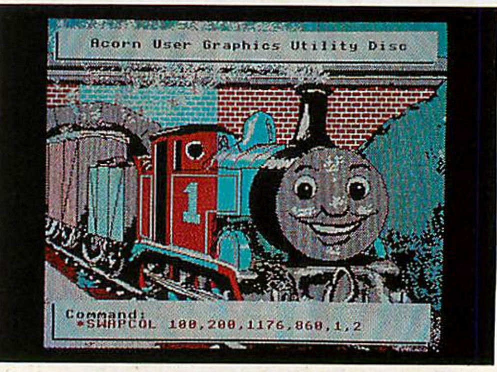
Games galore in our compendium cassette

BBC/B/B+/M/E You can guide Shuggy around his garden; puzzle over *Puzzle*, and be *3-D* amazed. Or destroy submarines with *Run Silent, Run Deep*. And for the really adventurous, go round the *Acorn User* office.

Best of all, try the truly different *Adventure* game written especially for the *Games Compendium* cassette by Rob Anderson. It's excellent value at £3.95.

You will also find David Acton's *Spectramania* and *Quadline* on this cassette: beat your micro, get four in a row. All are easily transferred to disc.

D I S C S



Graphics utilities for your screens

BBC/B/B+/M/C The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 routines to manipulate blocks of graphics: rotation and reflection, a screen compressor/expander, a colour flood-fill routine and three mode conversion commands.

With the Basic procedure library are multi-height, proportional and justified text and 'drop shadow' boxes. A teletext screen editor gives point plotting, line drawing, rubber banding and flood fill, along with all mode 7 control codes. All can be used in your own programs.

Acorn User order form on page 122 – 24 hour telephone service (0672) 40825

SPECIAL OFFER

ACORNUSER MICRONET

With communications being one of the fastest growing areas of microcomputing, Micronet and *Acorn User* have come together to offer you the complete communications package – a subscription to Micronet, Prestel and *Acorn User* at under half the normal retail price. The package includes:

■ THORN EMI MODEM 2000	*NORMALLY* £49.95
■ PACE MICRONET TERMINAL ROM AND DATA CABLE	*NORMALLY* £13.95
■ MICRONET ANNUAL SUBSCRIPTION	*NORMALLY* £40.00
■ PRESTEL ANNUAL SUBSCRIPTION	*NORMALLY* £26.00
■ TELECOM GOLD MAIL BOX	FREE
PLUS	
■ *ACORN USER* ANNUAL SUBSCRIPTION	*NORMALLY* £17.50
■ EXCLUSIVE *ACORN USER* TELESOFTWARE	*NORMALLY* £15.00
	Normal Package Price £162.40

ALL THIS AT OUR SPECIAL PRICE OF £75.95

To take advantage of this fantastic offer, simply complete the coupon below and return it, with a cheque made payable to Telemap Ltd, to the address below. Telephone 01-278 3143. If you already subscribe to *Acorn User* you can take up this offer and extend your subscription for a further 12 issues.

HURRY AND JOIN THE THOUSANDS OF ACORN USER'S ENJOYING MICRONET – THE OFFER CLOSES ON OCTOBER 31 1987

If you already own a modem, you can get a sneak preview of the Micronet database by dialling into the demonstration database. To connect dial your area number then key in identification number 4444444444, then as personal password 4444:-

South of England 01-618 1111
North of England 061-618 1111
Midlands 021-618 1111
Scotland 041-618 1111

Please rush me a Micronet/*Acorn User* Special Communications pack.
Start my subscription to *Acorn User* with the ________ issue.

I enclose my cheque for £75.95 made payable to Telemap Ltd.

Please charge my Access/Visa/American Express Card

Card No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry Date ☐☐☐☐

NAME

ADDRESS

POSTCODE

TELEPHONE

SIGNED DATE

PLEASE SEND THIS COUPON WITH YOUR REMITTANCE TO *Acorn User* Offer, Micronet, Durrant House, 8 Herbal Hill, London EC1R 5EJ. Offer closes October 31 1987.

LESS THAN HALF PRICE

Computers and Upgrades

Trade in your old Model B against a new Master 128 or Master Compact.

Master 128	£394.00 (a)
Master E.T. (Econet Filing System only)	£320.00 (a)
Master Turbo Upgrade	£99.00 (c)
Master 512 Upgrade	£189.00 (c)
Master 128 Eprom Cartridge	£11.00 (c)
Master 128 Dust Cover	£4.50 (e)

Special Prices on upgrades if ordered with Master 128. Phone for details.

BBC Master Compact from **£385.00 (a)**

All Compacts with Package Offers of Software etc. a value of £35 to £50 software etc. to your choice.

Compact RS 232 Interface	£26.00 (c)
Compact TV Modulater	£26.00 (e)
Compact Second Disc Drive	£99.00 (a)
Compact 5.25" Second Drive Cable	£11.00 (e)
1770 Disc Interface	£41.00 (d)
ADFS ROM (B+ or B with 1770)	£25.00 (e)
B+64 64K Upgrade	£30.00 (d)

Printers (Dot Matrix)

Tally MT 85 80col 180cps 45cps NLQ	£344.00 (a)
Epson LX86 80col/120cps + 16cps NLQ	£229.00 (a)
Juki 5510 80col/180cps + 30cps NLQ	£259.00 (a)
Juki 5510 Colour Upgrade Kit	£94.00 (c)
Canon PW 1080A 80col/150cps + 27cps NLQ	£229.00 (a)
Citizen 120 D 80col/120cps + 25cps NLQ	£164.00 (a)

Printers (Daisy Wheel)

Juki 6000 80col 12cps	£182.00 (a)
Juki 6100 110col 20cps	£280.00 (a)
Juki 6300 132col 40cps	£774.00 (a)
Citizen Premier 35 132col 35cps	£554.00 (a)

Printers (Laser)

Canon LPBAI (8 pages/min)	£1599.00 (a)
New Citizen Laser Overture 110 10 pages/min 250 Sheet cassette dual interface.	**£1650.00 (a)**

All printers include Free BBC cable or plus £5.00 for IBM lead.

AMX Mouse and Software

AMX Mouse + Super Art	£66.00 (d)
AMX Pagemaker	£37.00 (d)

SPECIAL OFFERS

Printers – Dot Matrix

MP 135 80col/135cps + 27cps NLQ	£135.00 (a)
MP 165 80col/165cps + 38cps NLQ	£166.00 (a)
MP 200 80col/200cps + 40cps NLQ	£249.00 (a)
MP 201 136col/200cps + 40cps NLQ	£274.00 (a)

Printers – Daisy Wheel

MP 26 – 26cps Diablo 630 compatible	£234.00 (a)
MP 40 – 40 cps Diablo 630 compatible	£319.00 (a)
2 Year Warranty on MP Printers	
Direct 0249 Dual 800K DS 40/80T inc. PSU on Master Plinth	**£215.00 (a)**

Disc Drives

Direct Drives all with full 3 yr. Warranty

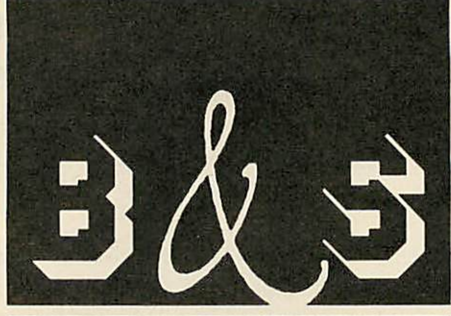
0241 40/80T DS 400K	£99.00 (a)
0243 Dual 40/80T 800K (Horizontal)	£194.00 (a)
0246 40/80T DS 400K Inc PSU	£114.00 (a)
0248 Dual 40/80T 800K (Horizontal) Inc PSU	£214.00 (a)
0249 As 0248 in Master Bridge/Monitor Plinth	£215.00 (a)
0250 As 0248 with 1 x 3.5" & 1 x 5.25"	£239.00 (a)

UFD Drives (2 yr. Warranty)

MD 802 C Dual 40/80T DS 800K (Vertical)	£214.00 (a)
MD 802 E Dual 40/80T DS 800K Inc PSU	£244.00 (a)
MD 802 DM As above in Master Bridge/Monitor Plinth	£284.00 (a)

Winchester Drives

20 mb incl. PSU and ADFS	£549.00 (a)
40 mb incl. PSU and ADFS	£869.00 (a)



COMPUTING

BUSINESS SYSTEMS • HARDWARE
SOFTWARE • VIDEO SYSTEMS
MEDIA SUPPLIES
OFFICIAL DOMESDAY DEALER



ACORN APPROVED DEALER

Phone 0602 787923

Disc Drives

Misc

Viglen SS 40T 100K	£79.00 (a)
Opus 50025S Single 40/80T Inc PSU (Dual Case)	£147.00 (a)
Discs 5.25" (Boxed in 10's Lifetime guarantee)	
3M 744 SS/DD 48TPI	£11.00 (d)
3M 745 DS/DD 48TPI	£13.00 (d)
3M 747 DS/DD 96TPI	£17.00 (d)
Add £1 for plastic library case	
B & S Label 96TPI in see through LIB. Case DS/DD	£13.00 (d)
Disc Cleaning Kit	£9.00 (d)
3.5"	
3M 35SS SS/DD (Box of 10)	£21.00 (d)
3M 35DS DS/DD (Box of 10)	£29.00 (d)
B & S Label DS/DD	£19.00 (d)

Lockable Anti-Static 5.25" Storage Cases

50 Disc Capacity	**£8.00 (d)**
100 Disc Capacity	**£10.00 (d)**

Monitors

All Monitors include BBC Lead

Phillips Range of high resolution Mono Monitors with Audio Input Green Amber or Paper White.

BM 7502 (Green)	£69.00 (a)
BM 7522 (Amber)	£74.00 (a)
BM7442 (Paper White)	£77.00 (a)
Phillips Colour Monitor RGB, Composite Video, Audio in Linear RGB Green Screen Switchable BBC/IBM Compatible CM8833	**£239.00 (a)**
Microvitec	
1431 (Metal or Plastic Case please specify) Std. Res.	£179.00 (a)
1451 (Metal or Plastic Case please specify) Med. Res.	£224.00 (a)
1441 (Metal or Plastic Case please specify) High Res.	£375.00 (a)
1431 AP Metal Case RGB and CV/Audio Std. Res.	£209.00 (a)
1451 AP Metal Case only RGB and CV Audio Med. Res.	£259.00 (a)
TILT and SWIVEL Stands for Plastic Case Only	£19.00 (d)
Hantarex	
CT 2001 Med. Res. CV Audio RGB	£POA
Plinths	
BBC B Single	£11.00 (c)
BBC Master Single	£12.00 (c)
BBC Master with Shelf	£22.00 (b)

UK Customers: please add 15% VAT to all prices (including carriage).
Government and educational establishments official orders welcomed. When ordering please enclose a cheque or postal order for the appropriate amount, UK Carriage Rates (a) £8.50 – courier insured delivery (b) £3.50 (c) £2.50 (d) £1.50 (e) £1.00. All prices are correct at time of going to press. All offers are subject to availability, all prices are subject to change without prior notification and are available on request. Current price list is available on request.

Goods normally despatched on receipt of order.

B & S COMPUTING (NOTT'M) LTD
THE LENTON BUSINESS CENTRE
LENTON BOULEVARD
NOTTINGHAM NG7 2BY
PHONE: 0602 787923

ROM Boards

ATPL Sideways (state B or B+)	£36.00 (d)
Viglen ROM System (B Series)	£11.25 (d)
Viglen ROM System (Master 128)	£12.00 (d)
Viglen ROM System Compact	£12.00 (d)
Viglen Spare Cartridges	£1.69 (e)

Printer Ribbons and Accessories

Epson 8302 LX 86 Tractor Unit	£19.00 (c)
Epson 8338 LX 86 SSF	£48.00 (b)
Epson LX 86 (Compat)	£2.89 (e)
Epson MX 80/RX 80/FX 80/FX 85/(Compat)	£2.50 (e)
Juki 5510/Citizen MSP 20 (Compat)	£2.50 (e)
Citizen 120D/LSP10	£3.75 (e)
Taxan 810/Canon (Compat)	£3.74 (e)
Juki 6100 Multistrike	£2.30 (e)
Tally MT85 Fabric	£5.00 (e)
Tally MT86 Carbon	£7.00 (e)
Printer lead 1.5m B/B+/M128/ELK + 1	£6.00 (e)
Printer lead 1.5m Compact	£8.00 (e)
Printer lead 2m IBM or Compatible	£10.00 (d)
80col Printer Stand	£11.00 (c)
Universal Printer STand	£15.00 (c)
Printer Switch Box 2 Way "T" Switch	£39.00 (c)

Modems

All Modems inc BBC Lead

Miracle WS2000	£95.00 (c)
Miracle WS4000 Hayes Compat	£144.00 (a)
Pace Nightingale + Commstar II	£94.00 (c)
Nightingale Auto Dial Auto Answer Board + SW	£52.00 (d)
Pace Commstar II ROM	£28.00 (e)

NB BABT APPROVAL ON MODEMS ONLY

50ft. Telephone Extn. Cable on Wind up Reel	£9.50 (d)

Software

Acorn Soft			
Micro Prolog	£50.00 (d)	ISO Pascal	£42.00 (d)
Logo	£44.00 (d)	BCPL	£39.00 (c)
Forth	£32.00 (e)	Comal	£32.00 (d)
Lisp	£33.00 (e)	Hi View	£37.00 (d)
View 2.1	£37.00 (d)	View 3.0	£56.00 (d)
Viewsheet	£37.00 (d)	View Store	£37.00 (d)
View Spell (80T only)	£29.00 (d)	View Plot	£21.00 (e)
View Index	£10.00 (e)	Overview	£84.00 (d)
View Printer Driver Gen. Tape	£7.00 (e)	Disc	£8.00 (e)
Computer Concepts			
Interword	£39.00 (d)	Inter Sheet	£39.00 (d)
Interchart	£26.00 (d)	Interbase	£POA
The Newly Released Spellmaster			**£47.00 (d)**
Wordwise	£30.00 (d)	Wordwise +	£37.00 (d)
Mirrorsoft			
Fleet Street Editor	£31.00 (d)	Fonts and Graphics	£11.75 (e)
Clares			
Fontwise +	£16.00 (e)	Replica III	£11.00 (e)
VINE MICRO REPLAY (State M/C and Disc Interface)			£30.00 (e)

NB It is essential to state machine and 40/80T when ordering software

Books (No VAT on books)

Master Ref. Manuals Pt1	£14.00 (d)	Pt 2	£14.00 (d)
Advanced Master Ref. Manual			£POA

Lisp	£7.00 (e)	Forth	£7.00 (e)	ISO Pascal	£7.00 (e)
BCPL	£14.00 (d)	View Guide	£6.00 (e)	Into View	£6.00 (e)
View 3	£9.00 (e)	View Sheet	£9.00 (e)	View Store	£9.00 (e)

Fanfold Paper and Labels

2000 x 1 Part 60gm 11 x 9.5" Std. Perf.	£11.00 (c)
2000 x 1 Part 60gm 11 x 9.5" Micro Perf.	£12.50 (c)
1000 x 1 Part 85gm 11 x 9.5" Micro Perf.	£9.00 (c)
1500 x 1 Part 90gm "Perfect" A4 Micro Perf.	£15.00 (b)
1000 89mm x 36mm Labels	£4.00 (d)
1000 89mm x 49mm Labels	£6.00 (d)
1000 102mm x 36mm Labels	£5.00 (d)

Please state Single or Twin Row. when ordering labels



REVIEWS

GAMES

THE GAMES PAGE

The first game for the Archimedes impresses David Lawrence as he does his monthly games round-up

The Archimedes, the new Acorn RISC machine, was formally launched at the *Acorn User* Show last month and most of you probably saw *Lander*, the game being given away free on the Welcome disc.

This is the sort of game that puts many dedicated arcade machines to shame! *Lander* is in fact a cut down version of *Zarch*, a full blown game planned for release later this year. *Zarch* has been written by David Braben, co-author of *Elite*. In the game, you are a highly manoeuverable *Elite*-like flying saucer. You must fly over the archipelago, doing your level best to defoliate the forest and evict the local residents from their homes! Control is with the mouse and requires a delicate touch to avoid crashing.

The graphics are stunning – the whole landscape scrolls in three dimensions and is fully shaded, there are splashes on the water if you fire at it, your ship changes shading as it rotates and the trees and houses even leave little smouldering piles of debris after you have shot them!

After cut-throat competition in the *Acorn User* office the high score is held by Sam Greenhill with a magnificent 710.

Anyway, if you ever have enough money to buy an Archimedes, then *Zarch* is a must. Just show it to anyone with an Amiga and watch them go an attractive shade of green!

Many other companies are working on Archimedes games, among the first should be *Space Adventure Game* from Argonaut and *Flight Simulator II* – if you've ever seen how fast *Flight Simulator II* runs on the Atari ST and Amiga, just wait for the RISC version! Finally for the moment, Rainbird's *Starglider* will be available, but now with more features and solid graphics.

Back with the model B, Superior is releasing the follow up to *Citadel*. This is going to be called *Castle of Magic* and will be in a very similar vein to *Citadel* with lots of colourful graphics, a large map



***Lander*, the Archimedes' first game**

(with over 100 rooms to explore) and many logical puzzles.

Superior should also have three full machine code games out for the Archimedes by the end of the year. While on the subject of Superior, a letter has come flooding into the office from Kevin Stanifirth about a problem in Giant Clam in *Repton 1*, he claims you can't get one of the diamonds because you get trapped by a rock. Well, Kevin, perhaps you are collecting the diamonds in the wrong order. . .?

Tynesoft's next release will be a sequel to *Winter Olympics* and it will be called – guess what? – *Winter Olympics II*! Anyway, for all you keyboard bashers or sports fans out there, here's another one for your collection.

Audiogenic has three games in the pipeline. In *Ziggy* you play the part of a spring, collecting gems – anything for a weird life! *All Star Golf* is a copy of the 3D golf game, *Leader Board*. Meanwhile, Gary Partis has temporarily shelved work on *Daxis* and he has instead written a version of *Arkanoid*, called *Impact*.

I have had a complete solution of *Cholo* sent in from Michael Knight. Rather than giving the whole thing away, here are some hints for those who are still totally confused by the game.

- Capture the flying eye; she's not very useful, but is fun to play with.
- Guards aren't very 'X'iting are they?
- You'll need to visit a pyramid to the east, and then the science institute.
- Then perhaps a short spell at sea might help, but beware of radiation!
- Finally, try on your Biggles hat and hum the *Dambuster's March*!?

There isn't really much to the game, but actually doing it is fairly awkward! Anyway, many thanks to Michael for the above. There were problems with *Cholo* on 80-track drives – it didn't work. Firebird should have sorted it out by now – but check before you buy.

For people still stuck in the *Twin Kingdom Valley* adventure, here are some hints from Richard Combe:

- Drinking at Watersmeet could be somewhat enlightening.
- Could the witch be a fortune teller?
- Try bribing the guard.
- Kings often give rewards to people for releasing princesses.
- The dragon can be killed by wood.
- Leave the castle carrying only the chest.
- You should then take whatever you might find inside the cave in the western mountains to the hut.

As Richard says, I hope this will help any lost wanderers.

Finally, here are the latest *Revs* lap times I have heard of:

Brands Hatch – 1:23.7
Donnington Park – 1:08.5
Silverstone – 1:23.1
Snetterton – 1:00.4
Oulton Park – 1:13.9

These were all set by Linus Surguy, so come on everyone, we can't have one person hogging pole position!

Maps – we've still got *Repton 2* maps available for £1, and *Ravenskull* for £1.50. We've also got maps of the *Xor* mazes. These cost £1 on paper, but they look better on screen – send us a disc (state format) and £2 and we will return you the maps as screen files.

MORLEY ELECTRONICS

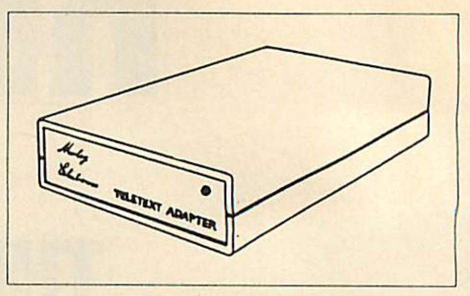
TELETEXT ADAPTER

Would you like access to free high quality software and over a thousand pages of information, but Prestel access charges and phone bills too expensive? Then read on!
The answer is Teletext. Yes the same system everyone has seen incorporated into television sets, but with a difference. When Teletext is read by a computer you can actually use the data.
The MORLEY TELETEXT ADAPTER introduces you to the world of Teletext at a price that won't break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than ten years ago, will be fully compatible with any future advances in the Teletext system.
With the Morley adapter you will get a state of the art unit that automatically tunes itself into the required station (no more messing around with screwdrivers or twiddling little knobs in the back of the case), a user friendly menu driven program, easy to follow instructions and a 12 month warranty. Add to this the free downloadable telesoftware and we are sure that you will agree that we are offering you one of the best bargains on the market today.

FEATURES:
* Advanced design uses the latest technology, will handle ANY future enhancements to the Teletext system e.g.: full field; 8 bit data transfer; 2k pages etc.
* Simply plugs into the user port.
* Low power consumption, less than 200ma. Optional power supply available.
* User friendly menu driven software including extended OSCLI and OSWord commands for access from BASIC programs.
* Supplied with 16k ATS (Advanced Teletext Software) and 16k support ROM software inc. printer dumps, page spoolers etc.
* FREE Telesoftware, no access charges (updated weekly).
* Save selected pages to disc/tape for later retrieval.
* Full access to all Teletext services and channels e.g.: CEEFAX, ORACLE, 4-TEL.
* Gives you a real-time clock at your disposal (*TIME).
* Software upgrades to allow for any enhancements to the Teletext service, e.g.: extra channels, full field data on cable & satellite systems etc. (only the media charge).
* Easy to follow comprehensive user guides.
* No hardware limitations, it can for example receive virtually unlimited numbers of channels.
* Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer (no more TV or Radio Times to buy).

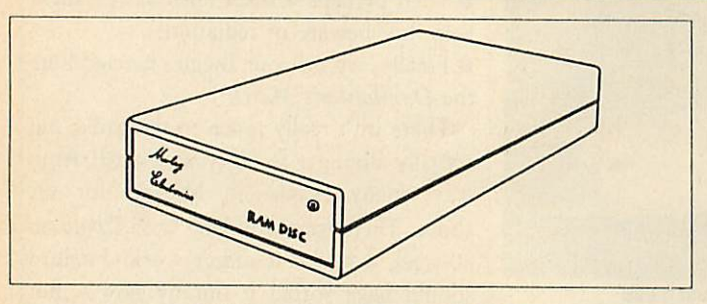
WHAT THE REVIEWERS SAID:

"...In terms of price, performance, future expansion possibilities and those little touches that show thought for the end user I would recommend the Morley unit."–*(Acorn User, January, 1986).*
"...The Morley unit has been designed to ensure that its operation is simple and smooth. It is the ideal Teletext adapter for school use."–*(A&B Computing, June, 1986).*
"...Using it over a number of months in different schools, it has proved utterly reliable, and may confidently be recommended."–*(The Times Educational Supplement, September, 1986).*



THIS IS THE BIGGEST SELLING TELETEXT ADAPTER CURRENTLY IN PRODUCTION WORLDWIDE, AND COMES WITH A FULL MONEY BACK SATISFACTION GUARANTEE.

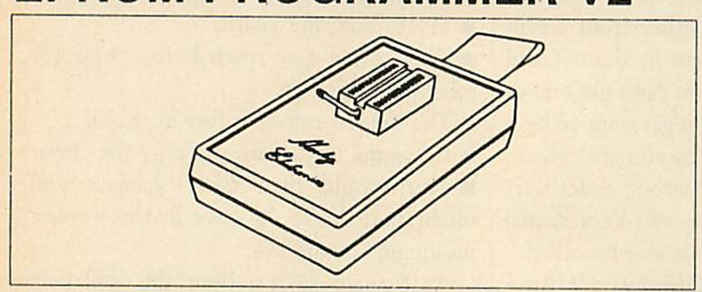
RAMDISC



Now available! The first true MEGA capacity RAMdisc for the BBC, BBC B+ and MASTER computers.
This fully compatible unit, currently available in either 1 or 2 megabyte versions comes complete with operating software on ROM, power supply, battery backup and a comprehensive user guide.

FEATURES:
One megabyte of RAM connected to the 1mHz bus. Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase of speed, for example, a 20k mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc. The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any Acorn compatible DFS (not ADFS). The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive number is 4. Any 'Dangerous' *commands such as *COMPACT, *COPY, *BACKUP etc can be intercepted and the BBC's RAM from page 2 to &7FFF saved to RAMdisc workspace, and may be recovered using a *command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The filing system wedge ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter verifier and 'sector'editor for use with the RAMdisc. Catalogue structure allows up to 2,688 files.
Well that's the spec., add to this our usual 12 month no quibble guarantee and we're sure you'll agree the Morley RAMdisc is the sensible alternative if increased storage capacity and speed is your requirement.

EPROM PROGRAMMER V2



The MORLEY EPROM PROGRAMMER V2 is a small self contained unit that plugs into the BBC or MASTER user port. It comes with a high quality ZIF (zero insertion force socket) and contrasting plastic case. Also included in the package is it's own user friendly menu driven software on ROM or disc.
This state of the art unit, allows programming of 2764 (8k), 27128 (16k), and 27256 (32k) EPROMS. Not only does the hardware allow programming of the usual NMOSdevices, but will handle the new generation CMOS equally as well, and with the average time taken to program a 16k at less than 30 seconds we believe it to be one of the fastest programmers available today.

THE HARDWARE
The Unit is completely under software control, there are no knobs or switches to baffle the novice, and the extended features provided should excite the pro's.

THE SOFTWARE
The comprehensive user friendly software included in the package has two main parts, the first allows EPROMS to be read, programmed, verified and edited, also allowing a ROM image to be loaded or saved to disc. The second is a full ROM management system in its own right, which has a host of useful features and routines, such as KILL and RESURRECT ROM to disable or enable a sideways ROM, dump ROM image to buffer or disc, move ROM image in buffer to sideways RAM, and VIEW-SEARCH any sideways ROM.
The whole system is available now for less than the price of one WORDWISE chip. So get yourself the all new MORLEY EPROM PROGRAMMER V2 today and start using those expansion boards for what they were made for! ROMS.
Immediate delivery no quibble 12 month guarantee.

SOFTWARE from M/B

DESIGN 7
Probably the best MODE 7 screen designer available.
DESFAX 7
MODE 7 Teletext vu-data system including screen designer and carousel facilities.
MASTERCOPY
Selective copier ADFS to DFS or vice versa. Supplied on ROM or DISC.

For further details on all products call 091 262 7507 after 4.00pm

To order please fill in and send order form to: **MORLEY ELECTRONICS, Unit 3, Maurice Road Industrial Estate, Wallsend, Tyne and Wear NE28 6BY.**

Adapter Software
ROM ☐
SWR DISC ☐
40 TRK ☐
80 TRK ☐
Please Tick

Please send me
Qty. ☐ Morley Teletext adapters @ £119.95 inc. VAT
Qty. ☐ Optional PSU @ £9.95 inc. VAT
Qty. ☐ Master Copy ROM @ £13.95 inc. VAT
Qty. ☐ Master Copy Disc @ £11.95 inc. VAT
Qty. ☐ Teletext utilities on Disc @ £5.95 inc. VAT
Qty. ☐ M/B DESIGN7 screen designer @ £7.95 inc. VAT
Qty. ☐ 1 Mbyte RAM disc @ £199.95 inc. VAT
Qty. ☐ 2 Mbyte RAM disc @ £349.95 inc. VAT
Qty. ☐ Eprom Programmer V.2 @ £27.95 inc. VAT
Qty. ☐ Desfax @ £23.00 inc. VAT

AU/9

Total £





NAME ________ PHONE No. ________ CHEQUE No. ________

ADDRESS ________

________ POSTCODE ________

Please add £3.00 P+P on Adapters and RAM Discs, £2.00 P+P on PSU's and Programmers, £1.00 P+P on Software.

Please allow 28 days for delivery

GAMES

EITHER XOR

Despite being crushed by chickens and flattened by fish, Robert Miller is still impressed by Logotron's *Xor*

Many months ago, a strangely named maze game appeared on a free trial disc on the front cover of another computing magazine. The game was *Xor*, and it was billed as *the* game of logic. Now, six months later, there are three incarnations; the original *Xor*, *Xor Designer* and the latest version, *Xor for Schools*.

For those of you who have not yet travelled through the super-logical domain, let me explain. You (depicted as two shields) must explore a number of mazes, collecting masks on the way. Simple I hear you cry! But with bombs that blow up in your face, fish that squash you flat and chickens that crush you against walls, life is not easy. As if that wasn't enough, there are force fields that allow you to travel either up and down or horizontally.

Collecting individual masks can be quite easy, but when a mask is buried under a pile of fish, chickens and explosives, things get tricky. By carefully moving your shield around the maze, objects can be pushed around, but don't forget about gravity!

In some extreme cases, say from level one onwards, your shield may get trapped, which is the cue for shield number two to come into action. By alternating between the two, even the most deeply buried masks can eventually be uncovered.

Two special characters included in the original *Xor* are the transporters, called BMUS – or Beam Me Up Scottys. These allow you to jump between areas in the maze that are otherwise entirely blocked off from each other.

Not wanting to appear completely uncaring, Logotron has included a facility by which small sections of map can be collected to form a complete plan of the current level. These show the walls plus any remaining masks, although one feature missing is a 'you are here' arrow!

On completion of each level, a special letter is displayed on the screen. If you manage to complete all 15 levels, the letters can be rearranged to form a password that qualifies you for the Order of *Xor*.

As a game I found *Xor* totally intriguing, but if you are only into mass carnage, this one is *not* for you. For those who prefer to take their time (there are absolutely no time limits whatsoever), this could be the game. The best way to describe it is as 'a thinking person's *Repton*'.



Making your own mazes with *Xor Designer*

Once the levels have been mastered there is no challenge and therefore no enjoyment. So it's a wise move to have a way for the player to manufacture his or her own game. For an extra £14.95 (disc), Logotron offer the *Xor Designer* to complement the original game. The *Xor Designer* can be played as a game, although only a small selection of levels are included with it.

The designer has three main sections: the Maze Designer allowing you to create new mazes from scratch or edit existing ones: the Icon Designer allows you to change appearance (but not the behaviour) of the *Xor* characters; and the Game Player allows you to play the game!

Mazes are designed on a 30x30 grid using any of the 15 characters provided. I found it easiest to start by first building a wall 'skeleton' and then placing the masks, fish, explosives and so on. Two mazes from the original *Xor* are included on the disc to start you off.

While it is possible to change the appearance of a particular character, it is important to note that the behaviour (like the fact the fish drops) cannot be altered. This means that even if the game looks entirely different, the tactics used to solve the puzzles will be the same.

It is a good idea therefore to redesign the characters according to their attributes. With this in mind, Logotron supplies an 'alternative' set of characters, all based on road symbols. Masks are represented as traffic cones, explosives as warning signs and map segments as tourist information signs (nice touch!). Like the mazes, new characters can be saved for later use.

Using the Game Player you can test out your new creations. Any maze can be used with any of the sets of characters, which are loaded in before each new game. Gameplay is identical to that of the original *Xor*. I'm glad to see the inclusion of features like 'piano' and 'forte' which allow you to decrease/increase the music volume, and the 'replay' option that enables you to review your previous turn – it can be amusing to see your errors speeded up.

A new facility is the option of a screen dump of any part of the current maze. This is useful if you are stuck on one particular section and want a rough copy that you can work on before committing yourself on-screen. If you successfully complete a maze, you are given the option of saving the game to disc. This effectively saves the solution of the maze.

If you have forked out the £10 for the original *Xor*, the additional cost of £15 for the designer might seem a bit steep. All you are really getting for your extra money is a facility to create new mazes, which you will probably end up playing! I think the price should be lower, say £9.95, with the original *Xor* game thrown in for free. If you are one of the people who prefer to think up alternative solutions for crosswords (don't laugh, they do exist!), this could be right up your street.

Xor for Schools is essentially the same as *Xor Designer* but with more examples of mazes and character definitions. There are also some teacher's notes including a brief synopsis of *Xor* and answering questions like 'how can *Xor* be useful to help practise thinking skills?'

The price of £26 seems a lot for something which in a simpler, though similar, form (*Xor Designer*), only costs £15.

Logotron, Dales Brewery, Gwydir Street, Cambridge CB1 2LJ. Tel: (0223) 323656.

RSA EXAMINATIONS BOARD CONSULTANT INFORMATION TECHNOLOGY

A part-time (80 days a year) Consultant is required for appointment as soon as possible.

The post is particularly concerned with providing additional professional advice to the RSA and to users of the RSA's schemes within the educational and industrial communities.

Applications are invited from those with experience in commerce/industry and at a senior level within further education.

Further details and application form may be obtained from:

James Richardson
RSA, 8 John Adam Street
London WC2N 6EZ

Micro-Aid

For the duration of this issue we have gone
Down under to exhibit in Melbourne

AUSTRALIA

Please send your orders and enquiries in for
PAYROLL, ACCOUNT or FAMILY HISTORY
and they will be despatched in our absence
25 Fore St., Praze, Camborne, Cornwall.

RAYCOMP DATABASE

NEW PRODUCTS

Features: *80 column display, up to 24 fields per record and 254 characters per field

* merge records with other files
* produce VIEW compatible files
* updated file information in header
* file size limited only by disc
* alphabetical, numerical sort on any field
* repetitive search (not basic versions)
* full edit/search + edit facility
* print records/selected fields (or via VIEW)
* versions for Shadow RAM/6502 second processors (+ turbo), Sideways RAM

COMPATIBLE versions for ALL Acorn microcomputers. This is the completely upgradeable database. DFS & ADFS versions. DFS-ADFS file transfer service.

Shadow RAM/6502 sec. proc. & Sideways RAM versions-£8.50. Basic ELK & BBC versions-£8.00. Additional versions (not Archimedes) – £4.50. Archimedes version 1 (RISC) – £14.40.

RAYCOMP GRAPHICS UTILITY

Plot line or scatter graphs, pie or bar charts with data from RAYCOMP DATABASE files or from keyboard. With screen dump printout. Price £7.50

EDUCATIONAL – CHROMOTOGRAPHY SIMULATION

Input sample size and number. number of theoretical plates, fraction size & number. Visual simulation, tabulation & graphical output. Suitable HNC/D, Degree courses in Chemistry, Biology & related subjects. Price £14.50

Orders/Enquiries: State full details of computer system, 40/80 track, DFS/ADFS to:
RAYCOMP, 46 Frenchs Avenue, Dunstable, Bed's LU6 1BH

BBC DUST COVERS

DIRECT FROM THE LEADING COVER MANUFACTURER

Tailored from the best quality ivory coloured nylon that has been coated with polyurathane to which an anti-static inhibitor has been added. These fabric covers are tastefully finished with brown piping and have the model name hot foil printed over the keyboard. They are washable and can be ironed with a cool iron.

BBC MASTER £4.95
BBC B/B+ £4.95
BBC COMPACT SET £8.50
(Please state colour or green shade)

MATCHING COVERS FOR PRINTERS, MONITORS AND DISC DRIVERS

A large range of covers for printers, monitors and disc drives are available to match the computer covers.

PRINTER COVERS FROM £4.50
MONITOR COVERS FROM £4.95
DISC DRIVE COVERS FROM £3.00

If you have a specific requirement please do not hesitate to contact us as we will be delighted to help.
Prices include VAT and First Class Postage. All our covers are unconditionally guaranteed. Please make cheqnes out to:

BBD Computer Dustcovers
The Standish Centre
Cross Street
Standish, Wigan




Trade inquiries welcome

TEL: 0257-422968
FAX: 0257 423909

SIGNWRITER

instant display lettering from a dot-matrix printer **£29.95** (BBC version)

* Signs printed across or down the page
* Sharp characters any size – the bigger the better
* Design logos, symbols on screen
* Extra fonts £5.75 each:

Rome, Hand, Shop, Olde, Zoo:, Dawn, Fair, etcetera

Available from the publisher:
WIGHT SCIENTIFIC
44 Roan Street, London SE10 9JT
(01) 858 2699

This advertisement printed A4-size with 16-bit SIGNWRITER

Portobello Trading Company

Special offer Citizen Lsp10 (Epsom/IBM compatable) £200.00

HARDWARE

Acoustic Modem (inc. software and leads) – £19.95
Acorn 1770DFS – £43.43
Acorn 512k MSDOS upgrade – £199.00
BBC to Centronics Printer cable – £7.50
ADFS ROM – £19.95
BBC Joystick – £4.95
Master 128 – £395.00
Master ET – £324.00
Master Compact form – £299.00

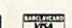
SOFTWARE

Electron View and Viewsheet **£9.95** each or **£14.95** for both.

View Store	£39.00	Interword	£42.00
View 2.1	£39.00	Intersheet	£35.00
Viewsheet	£39.00	Interchart	£22.00
Viewplot	£19.00	Spellmaster	£45.00
Viewspell	£25.00	Wordwise Plus	£45.00
Viewindex	£10.00	Wordwise	£20.00
Overview	£79.00		

Send S.A.E. for full list of games from **£1.99** each.
Carriage free in U.K. All prices exclude vat

300-302 Portobello High Street, Edinburgh EH15 2AS
Phone 031-657-2988 (9.30-5.30 Mon-Sat)

HARDWARE

HARD AND FAST

With the price of Winchesters dropping, a hard disc becomes an attractive proposition. Steve Mansfield reports

I know that file is somewhere. I distinctly remember saving it on a disc. Now if only I could remember which disc.

How often have you had that problem? One obvious answer is to put all your files onto one disc. It would have to be a pretty big disc, but fortunately that's not a problem any more.

Hard discs – also known as Winchesters and less elegantly as 'winnies' – can hold more data than the mind can comfortably imagine. Capacities of up to 20 megabytes are now very common, and it is possible to get discs which will hold several hundred megabytes of data.

The discs themselves are permanently fitted, but with that type of capacity you wouldn't want to change discs too often anyway. There are other advantages too.

The disc spins constantly, so there's no wait like there is when a floppy drive coughs into life. That makes access times – how long it takes to get data on to or off the disc – much shorter. Sometimes you'd be forgiven for thinking that the data was actually in memory, because access to it is almost instantaneous.



Heaps of hard discs; some of the machines on review

There can be a few surprises, however. I use *ViewStore* to manage a large database of names and addresses. It's on an ADFS disc for the simple reason that I need the storage capacity. The problem is that using ADFS on the Master can be frustratingly slow. I was hoping that switching to a hard disc would speed things up. It did – but not by much. Although it cut out the time usually taken by the floppy disc drive to get up steam and put the head in position, once it was reading or writing the data the difference in speed was minimal. In other words, the problem is often to be found in the software.

For most applications, however, disc operations are improved dramatically. And that doesn't just mean that you spend less time waiting for something to happen. It also means you can start using some of the advanced programming techniques that are so tedious with floppies.

For example, to help overcome problems with the BBC micro's limited memory, you can use program overlays – loading in whole sections of code as and when you need to run them. And you can use the disc as 'virtual memory'.

Cheaper discs

It may seem surprising that hard discs haven't become popular before. The reason is quite simple – the price of them. Until recently Winchesters were expensive. But like so many other pieces of computer equipment, the prices have started to fall, putting hard discs within the reach of home and small business users.

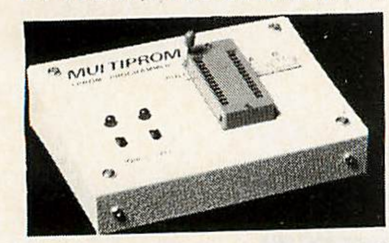
Acorn has been in this market for some time – it had to be. There's no sensible way of running a network off floppies. So Acorn's products are designed to fit in with its Econet system.

But you don't have to be running a network to make use of hard discs. They have advantages for the single user too. So most of the better-known disc drive suppliers have added Winchesters to their ranges. We were supplied with 20Mb samples by Akhter, Viglen, Technomatic, Watford Electronics and Amcom, but there are other companies producing them.

My main impression of these units is how little difference there is between them. Although I didn't bother opening them up, the Akhter 'User Friendly' drive appeared identical to the Watford and Technomatic models – which isn't all that surprising. Most suppliers get their products from a fairly small number of OEM manufacturers, so that most differences come down to the price and the name on the front. Of these three, the Watford unit, which comes with the ADFS ROM you'll need to use it, is the cheapest (see price list).

Of the units we looked at, the Amcom drive is the odd one out, as far as looks are concerned. It comes in an extremely large case – far larger than necessary, although it does look pretty robust. One novel feature is that the drive is lockable. Instead of an on/off switch, it's supplied with a key. The

MULTIPROM EPROM PROGRAMMER

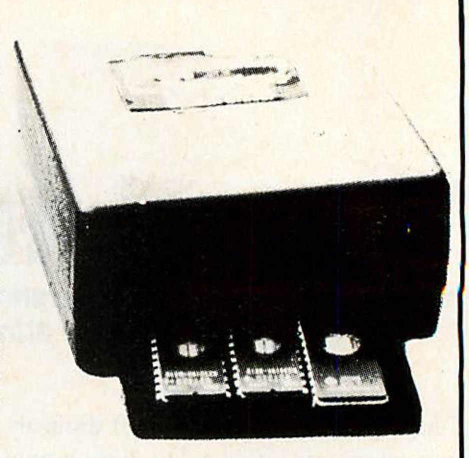


MULTIPROM allows the experienced user to program 2764, 27128, 27256, 27512, 27513 and 27011 EPROMs, including "A" version. Programming of 27256 up types is carried out in 16K blocks to ensure MULTIPROM compatibility with all models of BBC from B to Master. The UVP 1.1 software requires DFS and a disc drive for operation.

The fully cased MULTIPROM plugs into the user port on the BBC microcomputer, taking power directly from the computer, with an onboard converter providing the programming voltage. Two switches with LEDs are provided, one powering down the MULTIPROM to insert or remove an EPROM from the Textool ZIF socket, and one for Vpp on/off. DIP switches enable swift configuration of the MULTIPROM for each type of EPROM. The necessary UVP 1.1 software, which includes fast programming algorithm, is available on Sideways ROM and contains the following commands:– *TEST (blank check), *READ (afsp) (read Eprom to disc), *BLOW (afsp) (blow EPROM with names file), *VIEW (look at contents of memory from &2000), *COMP (afsp) (compare contents of EPROM to disc). When using *VIEW & *COMP, data is displayed in hex and ASCII format.

Prices: **MULTIPROM £44.95** **UVP 1.1 ROM £5.00**

UVIPAC EPROM ERASER



The UVIPAC was designed especially for the home microcomputer enthusiast, but is equally useful in the development lab when quick erasure of just a couple of EPROMs is required.

A special type of discharge tube is used to help achieve the very compact dimensions of the unit, which is housed in a 90 x 80 x 40 mm plastic case. The 230 or 110 volt (+ or -5%) mains powered unit enables up to 3 EPROMs of any size, or 1 CPU with on-board EPROM to be erased in around 15 minutes usually.

The EPROMs are simply loaded into the conductive foam pad supplied and inserted into the unit. After the door has been closed the unit is switched on, an optical fibre indicator showing positively that the unit is in operation. When the required period has elapsed the unit is switched off and the EPROMs removed. The UVIPAC can also be supplied with a built in fixed 15 minute timer, the UVIPAC (T), or with timer and audible time out sounder, the UVIPAC (TS). Spare tubes and conductive foam pads are available if required.

Prices

UVIPAC	UVIPAC (T)	UVIPAC (TS)
£21.45	£26.45	£28.45

MULTIPROM + UVIPAC (T) SPECIAL OFFER!!!

Buy a MULTIPROM, a UVP 1.1 ROM and UVIPAC (T) for only **£70.00**, a saving of £6.40 over the regular price. This offer lasts until Dec 31st 1987. In stock for immediate delivery on receipt of your order.

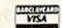
EPROMS Type	1–2	3–9	10 up
27C128-25	£3.50	£2.90	£2.60
27C256-25	£5.00	£4.90	£4.60



Send orders to:
Dept. AU
Ground Control
Alfreda Avenue
Hullbridge
Essex SS5 6LT
TEL: 0702 230324

ALL PRICES INCLUDE VAT AND P & P.
MAIL/TELEPHONE ORDERS ONLY PLEASE.
DETAILED DATA ON REQUEST





MICRO FIX

FAST REPAIRS FOR THE BBC MICRO BY THE ACORN APPROVED SERVICE CENTRE
191 FRESTON ROAD, LONDON W10 6TH

- Repair centre for BBC, B, B+ Electron, disc drives etc.
- We have been Acorn service specialists for 3 years and are justifiably recognised as experts in this field.
- BBC micro repairs: average cost £15-£20.
- Complete disc drive calibration: £15/drive
- Upgrades: Disc – £65 inc. installation.
  Econet – £65 inc. installation.
- Other upgrades carried out as required.
- All repairs fully guaranteed.
- Insured return carriage if required.
- Extended warranties available on most equipment.
- Low prices for Mitsubishi disc drives and Acorn peripherals.
- Acorn authorised Econet support centre. Expert installations and trouble-shooting.
- Express service by prior arrangement.
- Opening hours: Normally Mon, Tue 9.30am-6pm, Wed-Fri 10am-4.30, but phone first.

RING 01-968 9214 AND ASK FOR REG ELWOOD

M82A

It is not what we tell you before – it is what we do for you later that counts

LARGEST SELECTION OF BBC MODEL BD, COMPACT, MASTER, ELECTRON HARDWARE AND SOFTWARE

SPECIALIST BBC DEALER & SERVICE CENTRE

SALES:- 01-580 0181
TECHNICAL:- 01-631 1098

MAIL ORDER – – CHEQUES/P.O.

COMPUFACE LTD at Video City
233 TOTTENHAM COURT ROAD,
LONDON W1P 9AE.

We also deal in part exchange and second hand computers

COMPUTERS AND HEALTH

EPSILON SOFTWARE – SPECIALISTS IN NUTRITION + HEALTH

What we eat effects not only how we look but also how well we perform & how much we achieve.

Our programme will help you improve your health by:-

★ Examining your daily food intake
★ Warning you of any deficiencies
★ Giving constructive advice to help you improve your diet
★ Comparing your intake with recommended intakes
★ Help you achieve your ideal body weight

It will help you get more from life

Order form:
Please send ☐ copies @ £12.99 inc. p&p made payable to Dr Jocelyn Saini (nutritionist)
Type of computer model B ☐ or Master ☐
Type of Disc Drive 40 ☐ or 80 ☐ track
Name..
Address..
....

To Dr Jocelyn Saini, Epsilon Software, 45 Wych Hill Park, Woking, Surrey GU22 0HE.

COMPUTER SERVICING

BRITISH BROADCASTING CORPORATION MASTER SERIES MICROCOMPUTER

(established since 1979)

WE REPAIR – ON THE PREMISES – QUICK TURNROUND

☆ AMSTRAD PC AND OPUS PC
☆ BBC & ELECTRON (APPROVED SERVICE CENTRE)
☆ COMMODORE & SPECTRUM
☆ DISC DRIVES, PRINTERS, MONITORS
☆ HARDWARE HIRE – MINIMUM 10 DAYS

MAIL ORDERS by phone Access and Visa Accepted

A Range of Hardware, Software, Joysticks, Leads, *Interfaces* Chips etc, and Computer Paper always in stock

CROYDON COMPUTER CENTRE
29 BRIGSTOCK ROAD, THORNTON HEATH, SURREY CR4 7JJ. Tel 01-683 2646

THIS NOTICE WORTH £5
AGAINST ANY PURCHASE OF HARDWARE OR SOFTWARE OVER £50

AA90

company also supplied a 10Mb tape streamer which uses the same casing.

The discs come already formatted, and usually contain some utility software. The Akhter drives had very little, however – just one program called 'defects'. When I ran it the program replied with the message 'NO!', and that was it. I suppose I should be reassured.

When I plugged in the Watford drive I got a strong sense of *déjà vu*. Not only is it physically identical to the Akhter unit, but was supplied with the same software.

Amcom supplies a range of programs, including one which allows you to load the contents of your floppy discs on to the Winchester easily.

The Viglen drives have a suite of programs, most of which are similar to the standard ADFS utilities, but with a couple of additions. One of these is an intelligent backup program for use with tape streamers, floppies or another hard disc.

Technomatic has gone one better, supplying a complete WIMP-based front end system. This wasn't finished on our review sample but from what we did see it looks quite good. As well as helping you find your way around the disc, the system also has all the usual utilities.

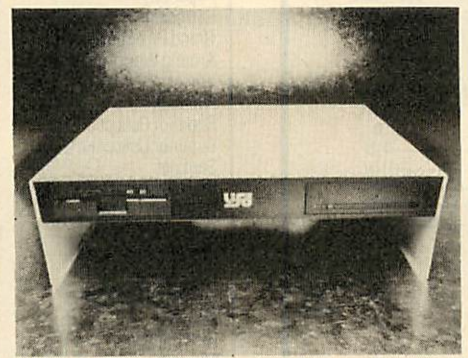
Higher capacity

Other options are available; higher capacity discs are common, and as well as stand alone units you can get discs mounted in monitor plinths. Akhter supplied us with its UFD 2000 which, at £900, is an expensive way of propping up your monitor, but fortunately it comes fitted with a 20Mb Winchester and an 80-track, double-sided floppy disc drive.

By now you probably want to know just how fast these discs are. There are plenty of benchmarks around, but they tend to be pretty meaningless in practice. Instead I decided to take a typical application and see how the discs performed.

I chose the Viglen to represent Winchesters – mainly because it was the one attached to my Master at the time. There are some speed differences between hard discs, but in practical terms they're not worth bothering about.

The floppy disc drive used in the test was my faithful old Technomatic unit. This isn't the fastest in the world – nor is it the slowest. Indeed, as floppy drives go it's typical of the vast majority of quality drives on the market.



Akhter's UFD2000 – an expensive monitor stand!

OPERATING SPEEDS

	Hard	Floppy	
To compile object code	116	166	207
To create stand alone program	7	42	97

All times in seconds

Finally, I searched around for a reasonable test. It needed to be something that was disc-intensive. And I eventually settled on Acorn's ISO Pascal.

Just recently I seem to spend half my life waiting for Pascal programs to compile, just so that I can see where the latest fatal bug has crept in. Compiled languages can lead to almost psychotic frustration, and I'm now convinced that anyone considering getting deeply involved in languages like Pascal and BCPL should take into account the cost of getting a Winchester.

That's jumping the gun a little, but as you can see from the table, the hard disc does make a difference. For those impressed by numbers, the source code I used was 13,221 bytes long, and I used disc to disc compilation with the debug option off, the final object code being 3942 bytes long.

Faster than floppies

Using floppies took nearly 50 per cent longer under DFS, and almost twice as long under ADFS. As if that wasn't enough to convince me, I then took the object code and created a machine code program using the Stand Alone Generator. This is where things got ridiculous. The floppy drive was six times slower under DFS and nearly 14 times slower with ADFS. Of course, speed isn't everything. The other main advantage to hard discs is the vastly increased storage. A 20Mb drive holds the equivalent of just over 100 sides of a normal 80-track DFS disc – although you would be surprised just how fast it fills up.

That probably sounds a lot. Well, yes, it *is* a lot. But there's a tendency to clutter up the disc with rubbish – early versions of programs that have long been superseded, wordprocessor files you'll never look at again, utilities with whose functions were forgotten long ago.

So you need to be disciplined about what you keep on the disc. Even if you're not quite ready to completely lose a file, you should put it on to a backup floppy, leaving the hard disc space free for something you're likely to need on a regular basis.

Filing system

It's worth taking a look at just how to use a hard disc. The most important thing here is the filing system. You have a choice of ADFS. . . or ADFS. This was produced with hard discs in mind. It's a hierarchical system, meaning that, as well as files you can also have named sub-directories which in turn contain files and sub-directories, and so on, forming a tree structure.

Master owners already have ADFS fitted to their machines, and so can plug in a hard disc and go without any messing around. BBC B+ owners will have to add the ADFS chip, which eats up some memory and costs a few bob, although some hard disc supplies, like Watford Electronics and Technomatic, supply the ADFS with the Winchester drive.

It's BBC B owners who have the most trouble. As well as fitting the ADFS chip you'll also want to replace your 8271 disc controller chip with a 1770. This is so that you can also run floppies on ADFS – it's not vital, but it will make backing up much easier. If you're not sure how to do this upgrade consult your dealer or ring Acorn on (0223) 214411.

Before creating directories and saving files it's worth spending a while, with pencil and paper, working out how you want your directory structure to work. Once you've created a tree of continuously branching sub-directories, it's hard to change it later.

At the top of the tree you'll want a directory called 'Library' in which to store machine code utilities, disc-based languages and other useful routines. The reason for

G-TEN LIMITED

THE MAIL ORDER SOFTWARE HOUSE

BBC MICRO	TAPE £	DISC £	3.5" £
Commando	7.25	11.25	N.A
Airwolf	7.25	11.25	N.A
Repton 3	7.25	9.75	11.25
Strykers Run	7.25	10.50	11.25
Crystal Castles	7.25	9.50	N.A
Dodgy Geezers	7.25	N.A	N.A
Ravenskull	7.25	9.50	N.A
Thrust	6.50	9.50	N.A
Yie Ar Kung Fu	7.25	11.25	N.A
B.C. Football Fortunes	7.25	11.25	N.A
Acornsoft X	7.25	9.75	N.A
Questrobe	4.25	N.A	N.A
Rebel Planet	4.25	N.A	N.A
Yie Ar Kung Fu 2	7.25	11.25	N.A
Citedal	7.25	9.75	11.25
Strike Force Harrier	7.25	10.50	N.A
Speech	7.25	9.75	N.A
Starquake	7.25	11.25	N.A
Elite	10.50	11.25	15.25
Trivial Pursuits	11.25	16.25	N.A
Scot Adams Scoops	7.25	N.A	N.A
Mikie	6.50	N.A	N.A
Revs	9.75	10.50	11.25
Sentinel	7.25	11.25	N.A
Five Star Games	7.25	N.A	N.A
Firetrack	7.25	11.25	N.A
Superior Collection 1	7.25	9.75	11.25
Superior Collection 2	7.25	9.75	11.25
Paperboy	7.25	11.25	N.A
Konami Coin-op	7.25	11.25	N.A
Temple of Terror	6.50	10.75	N.A
Round Heads	N.A	11.25	N.A

PERIFERALS (P&P £1.50 p/item)	OUR PRICE £
Amx Mouse	75.25
ATPL Sidewise	41.50
ATPL Sidewise +	30.00
Quickshot II	6.50
Quickshot II Turbo	11.50

ELECTRON	RRP £	OUR PRICE £
Xor	9.95	7.25
Five Star Games 2	9.95	7.25
Micro Power Magic	7.95	6.50
Superior Col. V3	9.95	7.25
Ravenskull	9.95	7.25
Repton 3	9.95	7.25
Bomb Jack	9.95	7.25
Commando	9.95	7.25
Football Manager	8.95	6.50
Crystal Castles	8.99	6.50
Paperboy	9.95	7.25

Please allow 14-28 days delivery. Please add 75p P&P per item (Indland/BFPO only) European orders add £1.50 P&P per item (inc. N.I/Eire). Elsewhere add £2.50 P&P per item. Please make cheques or postal orders (Sterling only) made payable to: **G-TEN LIMITED.**

UK or BFPO Orders, please send to:
G-TEN LIMITED, DEPT AU9,
FREEPOST (no stamp needed),
LONDON E1 6BR

Overseas Orders send to:
G-TEN LIMITED, DEPT AU9, 1st FLOOR
146/150 COMMERCIAL STREET,
LONDON E1 6NU

Telephone Enquiries Tel: 01-377 2630 24hr answer phone

C & F ASSOCIATES

BBC CASSETTE SOFTWARE Title	RRP	Our Price
Arkanoid	8.95	7.20
Crazy Rider	9.95	7.75
The Hunt	9.95	7.75
Spy vs. Spy	9.95	7.75
Paper Boy	9.95	7.75
Starquake	9.95	7.75
Grand Prix Construction	9.95	7.75
Around World 40 Screens	6.95	5.95
Xor	9.95	7.75
Firetrack	9.99	7.75
Superior Collection 1	9.95	7.75
Superior Collection 2	9.95	7.75
Sentinel	9.95	7.75
Ravenskull	9.95	7.75
Codename Droid	9.95	7.75
Elite	12.95	10.95
Strykers Run	9.95	7.75
Spy Hunter	9.95	7.75
Konamis Cin-Op Hits	9.95	7.75
Oxbridge	7.95	6.75
Rick Hanson	9.95	7.95
Myorem	9.95	7.95
Phantom Combat	9.95	7.50
Acornsoft Hits 1	9.95	7.75
Acornsoft Hits 2	9.95	7.75
Unbelievable Ultimate	9.95	7.75
Footballer of the Year	9.95	7.75
Sphere of Destiny	7.95	6.75
Graham Gooch Cricket	7.95	6.75
Omega Orb	7.95	6.75

BBC DISC SOFTWARE Title	RRP	Our Price
Crazy Rider	11.95	10.95
The Hunt	12.95	10.95
Graham Gooch Cricket	11.95	10.95
Spy vs. Spy	14.95	12.95
Paper Boy	14.95	12.95
Codename Droid	11.95	10.95
Grand Prix Construction	11.95	10.95
Around World 40 Screens	7.95	6.95
Xor	14.95	12.95
Firetrack	14.99	12.95
Mini-Office 2	16.95	14.95
Mini-Office 2 (Master)	19.95	17.50
Sentinel	14.95	12.95
Elite	14.95	12.95
Cholo	17.95	15.95
Colossus Chess	14.95	12.95
Enthar 7	16.95	14.95
Superior Collection 1	11.95	10.95
Superior Collection 2	11.95	10.95
MASTER COMPACT DISCS		
Mini Office 2	21.95	19.50
Imogen	11.95	10.95
Superior Collection 1	14.95	12.95
Superior Collection 2	14.95	12.95
Elite	19.95	17.50
Strykers Run	14.95	12.95
Grand Prix Construction	14.95	12.95
Codename Droid	14.95	12.95

ALL PRICES INCLUDE VAT AND POSTAGE & PACKING
(Overseas orders add £1.00 per order or Airmail £2.00 per item)

Cheques/PO Payable to: C & F ASSOCIATES and send to:

C & F ASSOCIATES (AU) CRANFORD HOUSE, WOOLSERY,
BIDEFORD N.DEVON EX39 5QY
Tel: (023 73) 619

Orders normally despatched within 24 hours of receipt, but allow 7 days



VECTOR 1

TAPE TO DISK UTILITY

FEATURES

+ Once only purchase
+ Can save to any disk
+ Very user friendly, help pages on disk
+ 40/80 Format
+ No awkward ROMs, can be used on any machine
+ Can load to all available RAM &400-&7FFF
= Simply the best tape to disk utility available

Vector 1 versions compatible with Acorn, Opus, UDM, Cumana, BBC + & Watford (Not 1-42, 1-43 DFS's.)

VECTOR 1 & VECTOR 2 now compatible with BBC + and Master series, Opus 1770 and also Solid-Disk Issue 2 inc.

VECTOR 2

DISK TO DISK UTILITY

FEATURES

+ 40/80 Format
+ User friendly, menu driven
+ Contains powerful features such as a disk sector editor, Disk Compare, format, verify and track repair
= The most powerful disk utility available

NEW IMPROVED VERSION (1.40)
Send £2.00 with old disk for upgrade.
PLEASE SPECIFY DFS
Prices: £12.00 each for Vector 1 or Vector 2 £23 for both.

Scythe Toolkit £21.95 (Send for full details)

All prices shown include VAT and p&p. Please add £3.00 per disk if you require 3" disks and specify when ordering.

Orders to:
CHALICE SOFTWARE, Dept AU
3 Merlin Way, Covingham,
Swindon SN3 5AN.
Telephone 0793 615026

BEEB-TEXT PLUS (BBC MODEL B ONLY)

The most versatile text display tool for the BBC Model B. Allows text of any size, any thickness, italics, eight fonts, shadowed fonts, any colours, any screen position. . .infinitely variable. ONLY LIMITED BY YOUR IMAGINATION. Screens can be used with your own programs or use the carousel display routine which is supplied. Epson screen dump included.

40 or 80 track disc. ONLY £19.95

FONT DESIGN

A font designer package for the Canon PW1080A or Kaga KP810 printers. Menu driven, easy to use. Comes complete with ten pre-defined fonts and pixel editor so that you can generate your own. Fonts include Gothic, Stencil, Outlined and more.

40 or 80 track disc. ONLY £9.95.

EPROMS & RAMS

27128-250 16k Eproms	£3.25
27256-250 32k Eproms	£4.00
6264LP-15 8k RAMS	£2.50
41256-15 Rams	£2.00

ALL PRICES INCLUDE V.A.T. @ 15%
PLEASE ADD £1.05 TO ALL ORDERS TO COVER CARRIAGE
ALL ORDERS TO BE ACCOMPANIED BY A CHEQUE OR POSTAL ORDERS
PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTIFICATION

TWYFORD COMPUTER SUPLIES
5 THE MEWS
PIG LANE
BISHOP'S STORTFORD
HERTS

this is that when you do a CTRL-Break the system automatically looks for a directory of that name and sets itself to use that as the current library. You can create the same effect manually by using the command *LIB LIBRARY.

Advantage

You're probably thinking 'so what?' Well, the advantage is that when you tell the micro to *RUN a file, if it can't find that file in the current directory it will go and look in the library. That means you can have a large set of utilities which can be used from anywhere within the directory structure. In effect, it's like adding extra commands to the operating system as, with disc systems, you can simply type a star and the filename – you don't have to bother with 'RUN'.

That applies not just to machine code utilities but to any machine code programs and also exec files. For example, in the library on my disc I keep the following exec file under the name 'Top':

```
*BASIC
*DIR
CH."!menu"
```

Whenever I type *TOP it takes me back to the root directory – by some perverse twist of logic the root is at the top of the tree in disc terminology – and runs a short Basic menu program called '!menu'.

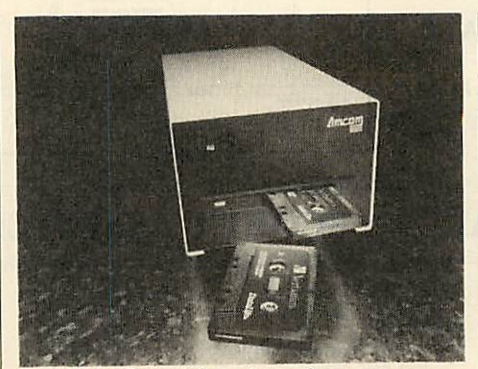
You could write similar routines to load in sideways ROM images, which means you always have ROM software to hand.

You've probably heard that Winchesters are delicate flowers that need to be protected against the harsh realities of the world. And it's true – up to a point.

The disc spins very fast. Throwing the Winchester around the room could misalign the heads, and even cause a head crash, tearing a nasty, and often irreparable path through your data.

That doesn't mean you have to work in a padded cell. Just treat the Winchester like any other fragile object with something of a tendency to self-destruction and you shouldn't have any problems.

It's worth keeping the unit well-ventilated. They all have built-in fans, but still tend to get hot. My cat, who feels she has a divine right to sleep on my nice warm Master, quickly took to resting her head, or the other end, on the hard disc. Don't be tempted to put manuals, floppy disc drives – or cats for that matter – on top of them.



Amcoms unit contains a tape streamer

PRICE LIST

Akhter HD2000 20Mb	£700
Akhter UFD 20Mb + 80T DS floppy	£900
Amcom 20Mb	£689
Amcom 10Mb tape streamer	£1093
Technomatic P20HD 20Mb	£603
Viglen VB20 20Mb	£650
Watford Electronics 20Mb	£574

It's also a good idea not to switch the unit on and off too often. Any electrical or electronic device stands to have its life shortened by frequent switching, and the drive head is most vulnerable when it's just starting up. Many business micro owners, who are long used to hard discs, leave their machines switched on all the time, figuring that the wear and tear caused by constant use is less than that due to regular surges of power from switching on.

Backing up

One thing you should do regularly is back up your files. If your hard disc breaks down it can be disastrous if you haven't got back-ups. You probably know what it feels like when you lose a floppy's worth of files – now imagine losing *all* your files. A horrific prospect.

There are two back-up options – tape and disc. But by tape I don't mean normal cassettes. You'd have to have the patience of a saint to try to back up 20Mb or more on to cassette. Let's face it, you have to be pretty patient to use discs.

Even if you go for the highest capacity of ADFS floppies, a 20Mb Winchester is capable of holding the same as 32 double-sided, 80-track discs. If you use any other disc format you'd better invest in a few large books, as you're going to have some time on your hands.

To back-up on to disc you'll need a utility program. If your hard disc doesn't come with a back-up utility you can always use the 'Dircopy' program supplied with the ADFS, but it can be very slow and tedious. The other option is simply to save the more important files on to a floppy disc from time to time.

Tape streamer

The tape I mentioned is a modified cassette which is used in tape streamer units. These run the tape through faster and can usually pack 10Mb on to one cassette. The problem is that they're usually more expensive than the hard discs themselves. That makes them very expensive for something that's just used for back-up. Indeed, they're only worth considering if your life – or your business – depends on having your data safe and sound.

Choosing one of these drives is tricky. The Viglen led the field in being quiet and smooth. It also booted up faster than the others. Of the three similar units – Akhter, Technomatic and Watford – the Watford drive is cheapest, but I'd still go for the Technomatic as it comes supplied with much better software.

When you buy, it's worth asking about after-sales support. No matter who they're from, hard discs can go wrong. If your Winchester contains all your programs and files this can be frustrating, even disastrous, so check out how quickly you can get it repaired or the files recovered. If you're using if for business it might be worth taking out a general service contract.

A hard disc is highly recommended for anyone who can afford it. You'll still need at least one floppy disc drive to use for transferring files on to the Winchester, but apart from that you'll find yourself using the Winchester most of the time. Now, if only I could remember which directory I put that file in.

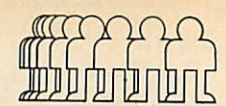
Akhter Group, Akhter House, Perry Road, Staple Tye, Harlow, Essex CM18 7PN. Tel: (0279) 443521.

Amcom, 35 Carters Lane, Kiln Farm, Milton Keynes MK11 3HL. Tel: (0908) 569212.

Technomatic, 17 Burnley Road, London NW10 1ED. Tel: 01-208 1177.

Viglen, Unit 7, Trumpers Way, Hanwell, London W7 2QA. Tel: 01-843 9903.

Watford Electronics, Jessa House, 250 Lower High Street, Watford. Tel: (0923) 37774.



MICROMAN Computers

UNIT 1A,
RAINFORD INDUSTRIAL ESTATE,
MILL LANE, RAINFORD,
ST. HELENS, MERSEYSIDE, WA11 8LS

PHONE 074488 3667

SHOWROOM

SHOWROOM OPENING
9-6 MONDAY TO FRIDAY
9-1 SATURDAY



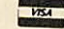
MAIL ORDER

PHONE 074488 5242

We accept both Access and Visa credit cards. Simply telephone your order, giving card number, expiry date, name and address, or send your order with cheque or postal order to the address opposite.

DELIVERY CHARGES INCLUDING VAT

Computers/Printers/Drives:
Next day £8.00, Trackback £4.00
Small Items: £1.00







ACORN DEALER : ECONET : SERVICE CENTRE





	Ex VAT	Inc VAT
• ARCHIMEDES 300 SERIES:		
(Expected delivery September)		
Archimedes 305 Base	799.00	918.85
Archimedes 305 Monochrome	849.00	976.35
Archimedes 305 Colour	999.00	1148.85
Archimedes 310 Base	875.00	1006.25
Archimedes 310 Monochrome	925.00	1063.75
Archimedes 310 Colour	1075.00	1236.25

Phone for prices and details of Archimedes 400 Series.

• BBC MASTER SERIES:		
Master 128	379.00	435.85
Master Turbo Module	108.70	125.00

MASTER 512 UPGRADE SPECIAL OFFER

£199.00

Price includes VAT.

This offer includes: FREE MICROMAN 512 DISC UTILITIES SOFTWARE WORTH £12.95.

• MASTER 512 SOFTWARE:		
Microman 512 Disc Utilities	11.26	12.95
Words & Figures	99.00	113.85
Ability (Integrated Package)	99.00	113.85
VP Info	86.09	99.00
Volkswriter	39.09	44.95
• BBC MASTER COMPACT SERIES:		
Master Compact	349.00	401.35
Master Compact + TV Modulator	363.00	417.45
Master Compact + Green Monitor	399.00	458.85
Master Compact + Colour Monitor	549.00	631.35
RS232 Kit	26.00	29.90
Additional Floppy Disc Drive	99.00	113.85
Pal TV Adaptor	26.00	29.90
• ECONET NETWORKS:		
Master Econet Terminal	329.00	378.35
Achemedes/Master Econet Module	43.47	49.99
Filestore E01	828.00	952.20
Filestore E20	721.00	829.15

OPUS DISC DRIVES

Opus 5802 400K 40/80T
£109.95

Opus 5802DB 800K 40/80T
£209.95

Opus 5802D 800K 40/80T + Power Supply
£239.95

Prices include VAT.

• BBC MONITORS:		
Microvitec 1431 Std/Metal	199.13	229.00
Microvitec 1451 Med/Metal	242.61	279.00
Philips CM8833 Med/RGB/CV	260.00	299.00
Philips TV Tuner (Composite Video)	69.52	79.95
Philips Green 7502	73.91	85.00
Philips Amber 7522	77.39	89.00
Philips White 7542	77.39	89.00
• BBC DISC INTERFACES/ UPGRADES:		
Acorn 1770 Disc Interface	43.44	49.95
Acorn ADFS ROM	26.08	29.99
Watford 8271 Disc Interface	60.00	69.00
• BBC B CO-PROCESSOR ADAPTERS:		
Acorn Co-Pro Adapter	75.00	86.25
Watford Co-Pro Adapter	50.00	57.50

	Ex VAT	Inc VAT
• BBC B ROM BOARDS:		
Watford Solderless ROM Board	32.00	36.80
Watford Battery Backup	3.00	3.45
Aries B12 Sideways ROM Board	40.00	46.00
Aries B12c Adapter	5.00	5.75
ATPL Sidewise ROM Board	38.00	43.70
• BBC B SIDEWAYS ROM/RAM EXPANSION:		
Watford 16K Sideways RAM Module	29.00	33.35
Watford ROM/RAM Card + 32K DRAM	39.00	44.85
Watford ROM/RAM Card 64K DRAM	52.00	59.80
Watford ROM/RAM Card + 128K DRAM	80.00	92.00
Watford Sideways ZIF Socket	15.00	17.25
• BBC B SHADOW BOARDS:		
Watford 32K Shadow RAM Board	59.00	67.85
Aries B32 RAM Extension Board	80.00	92.00
• BBC EPROM PROGRAMMERS/ ERASERS		
Control Telemetry EPROM Prog	95.00	109.25
Uviprom EPROM Prog	18.22	20.95
Uviprom EPROM Prog + ZIF	22.57	25.95
Multiprom Programmer	39.09	44.95

Uviprom & Multiprom programmers require either SWR or ROM software listed below.

Uviprom ROM Software	4.35	5.00
Uviprom SWR Disc Software	1.74	2.00
Watford EPROM Eraser GT	30.00	34.50
Uvipac EPROM Eraser	18.22	20.95
Uvipac EPROM Eraser + Timer	22.57	25.95
• EPROMS/RAM CHIPS:		
Eproms 2764 8K	3.00	3.45
Eproms 27128 16K	3.00	3.45
Eproms 27256 (12.5v)	5.00	5.75
Eproms 27512	9.00	10.35
RAM 6264LP-15 8K	3.00	3.45
• BBC MODEMS:		
Pace Linnet + Commstar II	139.00	159.85
Pace Nightingale + Commstar II	86.09	99.00
Watford Apollo Modem	75.00	86.25
• BBC SPECIAL KEYBOARDS:		
Concept Keyboard A4	109.50	125.93
Concept Keyboard A3	139.50	160.43
• BBC DIGITISERS:		
Graphpad II (BBC)	65.65	75.50
• BBC VIDEO DIGITISERS:		
Watford BEEB Video Digitiser	109.00	125.35
Watford Magazine Maker	129.00	148.35
• BBC MOUSE/TRACKERBALL PRODUCTS:		
Watford Quest Mouse	35.00	40.25
Watford Quest Mouse + Paint	59.00	67.85
AMX Mouse + Super Art	69.52	79.95
AMX Mouse Mat	5.00	5.75
AMX Pagemaker	43.44	49.95
AMX Extra Extra (Pagemaker)	21.70	24.95
AMX Super Art ROM: BBC B	43.44	49.95
AMX Super Art: Master	43.44	49.95
AMX MAX	17.35	19.95
AMX CAD	60.83	69.95
Fleet Street Editor	34.74	39.95
Fleet Street Editor Fonts/Graphics	13.00	14.95
Fleet Street Editor Admin Xtra	13.00	14.95
Fleet Street Editor Disney	13.00	14.95
Trackerball RB2 + ICON Soft	59.00	67.85
Trackerball + Pointer (Master)	59.00	67.85
• BBC/MASTER CONSOLE UNITS:		
Viglen Console	43.44	49.95
Viglen Master Console	52.13	59.95
• BBC CAD SYSTEMS:		
Bitstik 2 (Master Compatible)	694.78	799.00
Bitstik 2 Upgrade	400.00	460.00
Pineapple Diagram	25.00	28.75
Pineapple Diagram Utilities	10.00	11.50
Pineapple PCB Designer	85.00	97.75
Novacad Basic Version	59.00	67.85
Novacad Trackerball Version	81.65	93.90

	Ex VAT	Inc VAT
Novacad Plotter Utilities	21.00	24.15
Microman Plotter ROM	26.04	00.00
• PRINTERS:		
Star NL10 + BBC/Cent Interface	239.00	274.85
Star NX15 Wide Carriage	339.00	389.85

PANASONIC KXP1081

Printer + Free BBC Lead

£179.00

Price includes VAT.

Epson LX800	239.00	274.85
NEC Pinwriter P660 (80) Parallel	449.00	516.35
NEC Pinwriter CP660 (80) Parallel	519.00	596.85
NEC Pinwriter P760 (136) Parallel	529.00	608.35
NEC Pinwriter CP760 (136) Parallel	619.00	711.85
Juki 6100 Daisywheel	299.00	343.85
Panasonic Serial Interface	41.00	47.15
Star NL10 Sheet Feeder	55.00	63.25
Star NX15 Sheet Feeder	140.00	161.00
LX800 Sheet Feeder	TBA	
Print Sharer 2 Way Switch	39.00	44.85
• PLOTTERS:		
Roland DXY880A A3 Plotter	694.78	799.00
Roland DXY980A A3 Plotter	999.00	1148.85

We are a Roland Main Dealer and stock the complete range of plotter, pens and paper.

• BBC WORDPROCESSING SOFTWARE:		
View Professional	86.91	99.95
Interword ROM	42.61	49.00
Wordswise Plus ROM	42.61	49.00
View 2.1 ROM	45.22	52.00
View 3.0 ROM	68.70	79.00
Spellmaster	51.31	59.00
Viewspell	34.74	39.95
View Index	13.00	14.95
View Printer Driver Generator	10.00	11.50
• BBC DATABASE & SPREADSHEET SOFTWARE:		
Master Overview	86.00	98.90
Interbase ROM	60.00	69.00
Viewstore ROM	45.22	52.00
Intersheet ROM	43.44	49.95
Interchart ROM	29.52	33.95
Viewsheet ROM	45.22	52.00
Viewplot Disc	26.04	29.95
• BBC LANGUAGES:		
Master C	78.00	89.70
BCPL ROM	52.00	59.80
BCPL Calculations	30.00	34.50
BPCL Stand Alone Generator	43.39	49.90
ISO Pascal ROM	52.13	59.95
ISO Pascal Stand Alone Gen	30.00	34.50
Comal ROM	43.35	49.85
Acorn LOGO ROM	60.00	69.00
Logoton LOGO ROM	60.00	69.00
Micro-Prolog ROM	69.52	79.95
Microtext	52.00	59.80
• BBC UTILITIES:		
Master Termulator	34.74	39.95
System ADE + BBC Version	46.00	52.90
System ADE + Master Version	49.00	56.35
Advanced Disc Investigator	25.00	28.75
Advanced Disc Toolkit	30.00	34.50
Vine Replay ROM's	30.44	35.00
Vine Master Replay	36.48	41.95

We stock a large range of utility software by ACORN, CLARES, BEEBUG, COMPUTER CONCEPTS, WATFORD etc.

PC COMPUTERS & SOFTWARE:

We stock the OPUS PCII & AMSTRAD PC1512 range of PC Computers along with a large selection of add-ons and books. Full Price List available.

GOVERNMENT, NHS AND EDUCATIONAL ORDERS ACCEPTED

SOFTWARE

QUICK ON THE DRAW

Watford's latest art program, *Quest Paint*, gives existing packages a run for their money. Robert Miller checks it out, and gives some mice the run around

Until recently, *Super Art* from AMS had been judged by many to be the definitive mode 1 graphics package for the BBC micro. But it now has a serious rival in the form of *Quest Paint*, from Watford Electronics. To complete the package, Watford has also brought out its own three-button mouse. The mouse performs well in the face of competition from AMS, Wigmore and the rest. I'll be examining this in more detail later.

Quest Paint resides in a 32k ROM chip, the type currently used by Computer Concepts in its *Inter* range. The EPROM chip sits on a tiny circuit board with an additional chip to control memory selection. The whole unit takes up just one precious socket – other companies please take note.

In addition to the mouse and chip, an instruction manual and a utility disc are provided with the package. The manual covers every aspect of *Quest Paint* and includes an indispensable chapter about getting started.

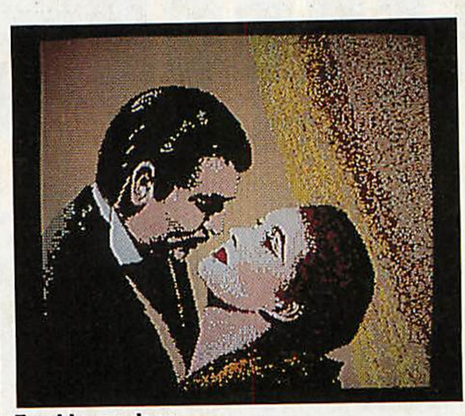
Pages are all numbered, although the Watford chapter/sub-chapter system of indexing is used throughout. This can make finding particular subjects difficult. One other niggle is in the presentation of the manual. Watford goes to the trouble of pointing out that the manual was produced on a laser printer but it has still used mono-spacing in the text and it looks as though it was produced on a typewriter! I should, however, point out that the manual is provisional and hopefully these points will be rectified in future printings.

The disc contains a number of utilities plus a selection of default files used by various functions of *Quest Paint*. The programs include an extended picture creator allowing pictures larger than a single screen to be drawn. When using an extended picture within *Quest Paint*, a small hand icon is used to allow you to pan the whole screen in any direction. This option is actually a utility on the disc.

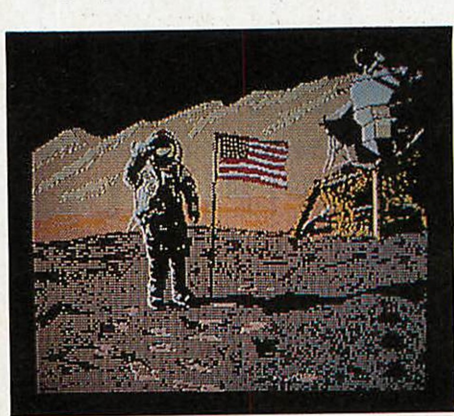
A printer customiser is included to allow compatibility with as many printers as possible; something which can usually be quite a headache. The final utility is a stand-alone star command to load pictures created with *Quest Paint*, complete with their respective palette. Screens can be loaded directly without having to change load addresses or worry about palettes.



Screens from *Quest Paint*



Frankly, my dear. . .



A small step for a computer

As *Super Art* has been around for the last two years, Watford has had plenty of time to watch the competition and discover what the user wants. The result is an extremely comprehensive and professional art package. Although there are one or two minor omissions, the scope and range of facilities should satisfy all but the most specialised of users.

The package is designed to work on all types of BBC micro, though some functions only work fully with shadow and sideways RAM fitted in the machine. The differences are only minor – for example, you must have sideways RAM fitted to access two menus simultaneously.

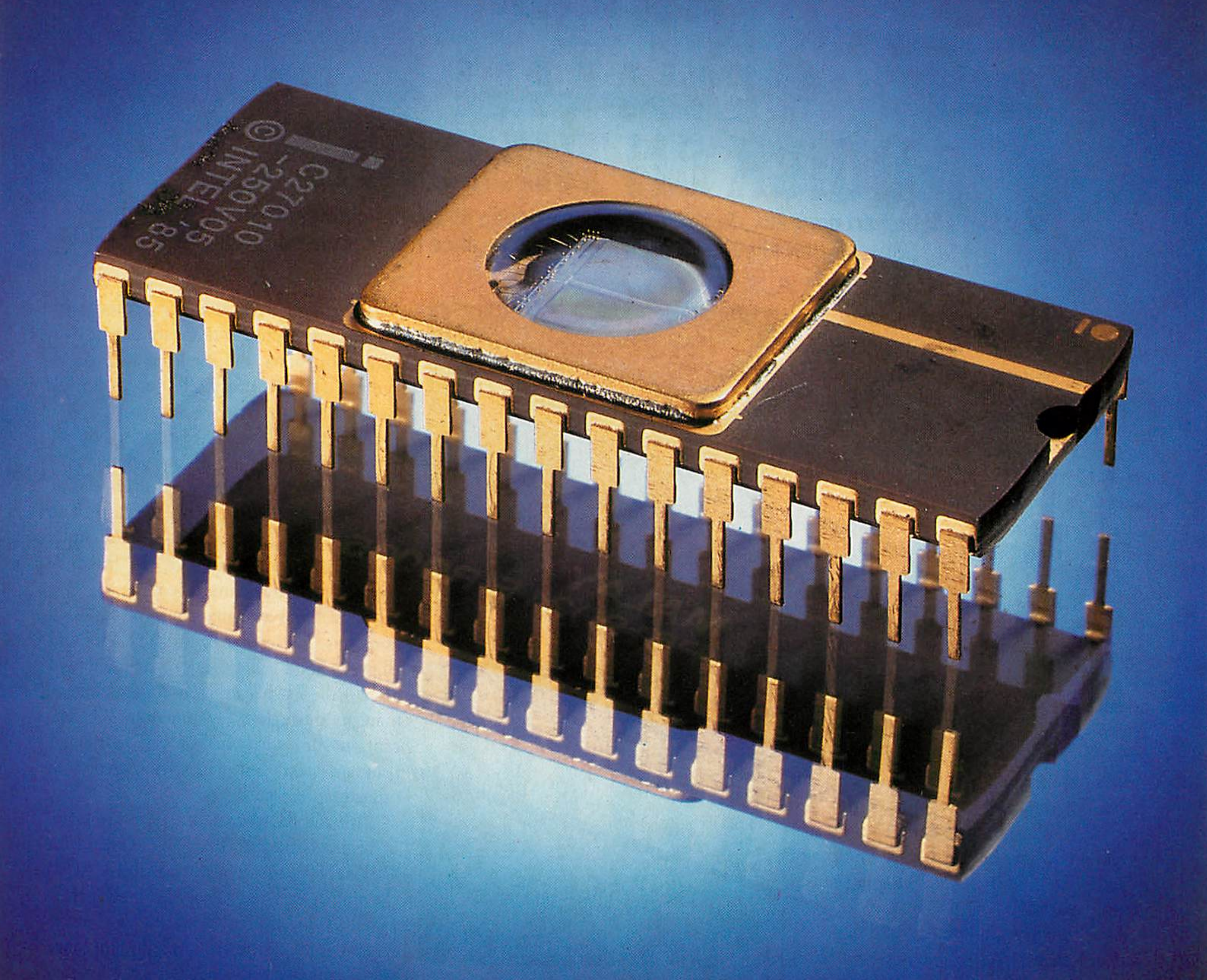
The facilities available cover all the usual functions, like rubber-banding, circles and ellipses, flood filling, zoom and cut and paste – the list is extremely long, so rather than go through every function, I'll concentrate on what makes this particular program stand out when compared with other graphics packages.

With the ROM installed, you are ready to begin. Issuing a *PAINT command (or *WPAINT to avoid possible ROM clashing) clears the screen and puts you in *Quest Paint*. You're faced with an empty screen – no cluttered borders, no fancy icons hanging in the wings; just a solitary pencil inviting you to draw.

Being keen to get down to some serious graffiti, the manual received no attention whatsoever and I went headlong into my first masterpiece. As I tried every combination of buttons possible, the screen soon filled with garbage. Menus appeared from nowhere and disappeared just as quickly. I soon discovered that reading the manual was essential in order to get recognisable doodles. Sixty pages later – and wiser – I was finally ready.

As mentioned earlier, the whole screen is available for drawing. If and when a new function is required or a new colour is to be selected, the respective menu can be called up with a click on the mouse's right button. There are two main menus available, the utilities menu and the palette.

In addition to the two menus, the mouse's middle button can be used to select further functions. These options are referred to as tools, and consist of an eraser, a zoom function and panning. One



SPELL Master

Spellmaster contains 59,536 separate English words stored in 131,072 bytes in one chip

- Compatible with all BBC models
- Works with INTER-WORD, WORDWISE PLUS and VIEW
- Checks spelling at up to 10,000 words per minute.
- Checks text as it is entered

SPELL-MASTER ROM

This is the first completely ROM based spelling checker in the world. As a result it out-performs all known spelling checkers on this machine or any other micro-computer. The single 128K EPROM contains over 59,000 separate words and 22K of program.

Compatible with all BBC Micros

Special switching techniques ensure that the 128K ROM appears to the machine as one single 16K ROM - this guarantees that it is completely compatible with the ROM sockets in all versions of the BBC Micro- computer.

Compatible with all the major word processors

SPELL-MASTER has been designed to fully integrate with the most popular word processors on the BBC, WORDWISE and WORDWISE PLUS, VIEW and of course INTER-WORD. While editing in these word processors all that is necessary to control SPELL-MASTER is to press one CTRL key (Usually CTRL-J). This causes a menu to appear listing a variety of options such as 'Check entire text', 'Check word at cursor', 'Continuous check - on/off etc. Text is checked directly in memory while in the word processor. There are even short-cuts to the menu, for example, pressing CTRL-V in any of the above word processors will start checking the text immediately from the current cursor position. Compare this with the process of checking text in the most highly rated competitive product - VIEWSPELL.

VIEWSPELL	SPELL-MASTER
•Save text from word processor. •Enter spelling checker. •Load text into spelling checker. •Check the text. •Go back to word processor. •Load marked text. •...finally, make corrections.	•Press CTRL-V • make corrections.

Check entire text

In a word processor, SPELL-MASTER can check at up to 10,000 words per minute. Whenever a word is indicated as misspelt the user is given three simple choices. Replace the word with another selected from the dictionary, ignore the word altogether or add it to a user dictionary.

Check as you type

Because the dictionary is ROM based it is possible to check words as they are typed. This feature works with all the above named word processors and does not slow the operation of the word processor at all. Whenever an incorrect word is entered the computer will bleep; the word may then be corrected or simply ignored.

User Dictionaries

SPELL-MASTER supports extensions to the main dictionary in sideways RAM or ROM. This has the advantage that there is no speed degradation when checking against user dictionaries, since there are no disc accesses required at all. Once a word is added to a user dictionary it is treated as if it is present in the main dictionary.

SPELL-MASTER can support a number of separate dictionaries at once, each sideways RAM or ROM holding up to 3000 additional words. Once a dictionary has been created it can be 'burned' into an EPROM to form a permanent extension to the main dictionary.

Provision is made for editing any dictionary extension, for adding or deleting words in bulk, and directly loading or saving user dictionaries from or to sideways RAM.

Additional star commands

These can be issued from any language ROM such as spreadsheets or BASIC (they can even be included into BASIC programs). Some of the 8 commands are:

*CROSSWORD - Will search the entire dictionary for words that exactly fit the search pattern. For example *CROSS. ##M#U#ER would list ARMOURER, COMMUTER, COMPUTER. It takes about 8 seconds to check against all 59,000 words.

*ANAGRAM - Will list all the words in the dictionary that contain the same letters as those specified.

*FUZZY - Will list all words that sound something like the one you are searching for. If you are not sure of the spelling of a word then entering the approximate spelling here will generally list the word you are looking for.

Price: £59.00 incl.

Upgrades

Owners of the older two chip versions of SPELL-MASTER can upgrade to the single chip version for £25.00. However this new version is functionally equivalent and so it should not be necessary to upgrade.

2nd processors

Due to its unique design SPELL-MASTER will not work with word processors running on the 6502 2nd processor, although there are facilities provided for checking long text files.







Gaddesden Place, Hemel Hempstead, Herts HP2 6EX Telephone: (0442) 63933

nice thing about the eraser is that it stays on screen when you are actually using it. This makes it much easier when carrying out delicate deleting.

Choosing the zoom facility causes a window, an eighth the size of the screen, to appear at the base of the screen, and a tiny magnifying glass icon replaces the cursor. By moving the glass over the area to be magnified and pressing the relevant button, a zoomed image appears in the window. The magnified image is four times the actual size, and can be magnified further to eight times.

The majority of functions available in the utility menu can be found in other art packages. What makes *Quest Paint* so versatile is the addition of a sub-menu which allows you extensive control over each function. These sub-menus vary in content from function to function although some options remain common throughout.

One such option is 'protect'. In practice, this is a method by which masking can be achieved. If, for instance, you had drawn a red wall and wished to draw an object to be seen through a hole in the wall, then by marking red in the protected colour palette and choosing the 'protect' option from the sub-menu, all subsequent drawing over red will be ignored.

Another similar option which allows selective use of colours is 'transparent'. Normally, when using cut and paste, all graphics enclosed within the cut box are copied or moved to the resulting paste box. If the 'transparent' option is used, it's possible to superimpose drawings on top of other pictures without losing any of the background detail.

The masking provided with 'protect' and 'transparent' makes the cut and paste functions very powerful. Another useful option rarely found elsewhere, is the ability to scale cut-outs. Parts of the screen can be shrunk down or stretched to order. Cut-outs can also be rotated through units of 90 degrees and/or reflected in X or Y axes.

As well as allowing the user to mark colours for the 'protect' and 'transparent' options, the colour palette menu also gives access to a selection of brushes. Eight brushes are available, all of which can be defined by the user on an X–Y grid. Pattern design is catered for similarly, with eight different designs being available. Brushes and patterns can both be saved to disc, and various examples of each is supplied on the utility disc.

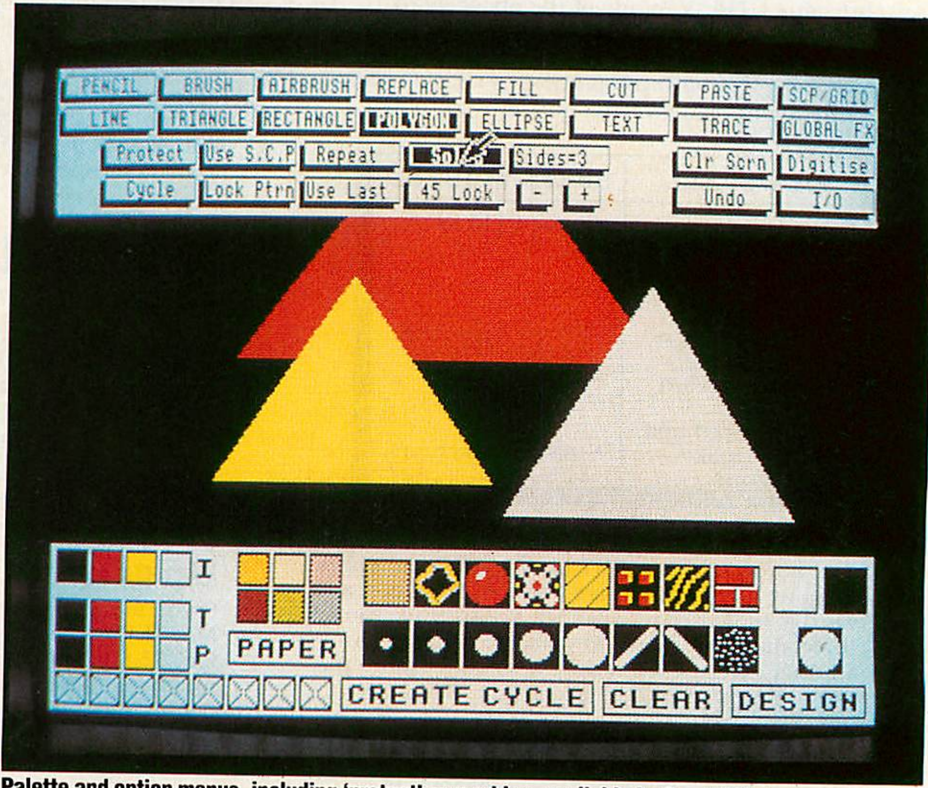
In most art packages, provision is given for drawing triangles and rectangles. *Quest Paint* goes 14 better, allowing any regular polygon of up to 16 sides. These can be either outline or solid.

Sometimes when drawing, you may need to repeat a shape over an area. The option 'use last' is provided in the sub-menu so that multiple copies of shapes can be drawn. By using another option – 'repeat', in conjunction with 'use last', the last shape drawn can be continuously used for drawing – effectively like a brush. This method will work for most of the functions available, allowing for an almost infinite selection of brushes to choose from.

Brushes are fine for slapping on colours, but when some kind of texturing is required, an airbrush is essential. In most art packages, the airbrush is just a brush



Mouse magic; (left to right) Quest, AMX III, and Nidd Valley mice



Palette and option menus, including 'protect' or masking, available in *Quest Paint*

consisting of a number of dots in fixed positions, *Quest Paint*'s airbrush is better with dots of the current pattern/colour being sprayed at random over the given area. The area covered by the airbrush can be one of four, giving effects ranging from a dotted line to a wide spray.

Diagrams can be labelled using one of four fonts available in *Quest Paint*. The fonts are available in either roman or italic. Text can be positioned anywhere on screen and can also be of any size, both vertically and horizontally. It is displayed by first inputing the string, then drawing a box and size into which the text will be placed. One option which is lacking is the ability to design your own fonts. An additional 24 fonts are available separately for £12, although a font designer on the utility disc would have been useful.

One facility, not found in any other art package to my knowledge, is the ability to access a digitiser from within the program. The digitiser in question is Watford's own model – nice marketing lads! When the option is chosen, *Quest Paint* activates the digitiser and an image is passed back. The digitised picture produced can then be manipulated just like any other picture. Of course, if you have a different digitiser, there is nothing to stop you from pre-recording screens and then transferring them to *Quest Paint* at a later date.

I have intentionally missed out standard functions – rubber-banding, ellipses, and so on – in order to concentrate on the unique features offered. As a measure of what is contained with *Quest Paint*, I would say it had all the facilities of *Super Art* plus the ones I've covered here.

Although extremely comprehensive in its content, there are one or two features which could complete the package. Useful additions would be a true cut and paste allowing you to cut out any shape with the mouse; variable rotation of shapes (not just in 90° steps); and perhaps some new or user-definable fonts.

All in all, *Quest Paint* is a very professional package. It contains virtually every function that the budding artist would require. As a result, it appears rather complex at first, but by reading the manual a few times and experimenting with all the functions, it is possible to get to grips with *Quest Paint*. Having used it now for about a month, I find it quite easy, given time, to run off the odd masterpiece.

At £67.85 (including the Quest Mouse), this package represents excellent value for money. If you are interested in computer art, then this is the program for you to buy. Given time, I can see no reason why *Quest Paint* shouldn't take on the title of the definitive art package available for the BBC micro to date.

The Quest Mouse is £40.25, Quest Paint costs £44.85, or buy mouse and software together for £67.85, from Watford Electronics, Jessa House, 250 Lower High Street, Watford WD1 2AN. Tel: (0923) 37774.

The new AMX mouse is £39.95 from AMS 166-170 Wilderspool Causeway, Warrington WA4 6QA. Tel: (0925) 413501.

The Nidd Valley mouse is £34.95 from Nidd Valley Micro Products, Thorpe Arch Trading Estate, Wetherby, West Yorkshire. Tel: (0937) 844661.

The Marconi Trackerball costs around £47 from Marconi distributors. For more information contact Marconi Electronic Devices, Power Division, Carholme Road, Lincoln LN1 1SG. Tel: (0522) 29992.

A MOUSE FOR ALL SEASONS

Art packages come into their own when used with some form of hand-held input device – and the mouse has become the most popular. Watford has now introduced its own mouse. Dubbed the Quest Mouse, it comes in an attractive two-tone grey with three buttons sloping away from the user. A rubber-coated steel ball is used to give the mouse good accuracy while at the same time making it feel substantial.

The rubber-coated ball means the mouse works well on a variety of surfaces. I've used it on wood and plastic laminate with no loss of control. The mouse casing, although angular, is nicely rounded and comfortable. Button travel appears to be just right — not too far so as to tire the fingers, while at the same time not being too sensitive. The mouse is compatible with AMX software and so should also work with Peartree's *Artist* program. I tried it with *Super Art* and found it functioned well compared with the AMX mouse Mk II.

AMS has also released a new AMX mouse, while Nidd Valley has improved its existing model. The new AMX model is the one that Acorn has badged for use with its Archimedes series of RISC-based computers. If you have been unable to use the new machine, you should at least be able to get in a bit of practice with the mouse! The mice differ only in appearance; the Archimedes mouse has a cream body with grey buttons, while the AMX mouse has a grey body with red buttons. The buttons hardly move at all, but they give a satisfying click when pressed. A resin ball is used, and the mouse is accurate over most surfaces. As the ball is plastic and not metal, the mouse is surprisingly light, but the ball is sprung to compensate. It may be interesting to note that it is manufactured in Switzerland, perhaps there's some connection with the cheese industry!

The Nidd Valley digital mouse has been around for about a year, and Dave Atherton reviewed the first version in the February 1987 *Acorn User*. Since then the button switches have been improved and the ball changed.

Not having used the original version, I can't compare the two, just make judgements on the updated mouse. The case is larger than that of the others reviewed here, and felt solid, if a little chunky. The three buttons sit proud on the edge of a sloping front. The buttons require a greater amount of pressure than the others do to function correctly.

The ball is made of solid rubber (doubling quite well as a toy for my cat!) and works well on almost any solid surface. A seam left over from when the ball was moulded can cause it to jam occasionally, although, after some use, it slowly wears away.

One nice feature, not found elsewhere, is the inclusion of a linear-lock switch which allows horizontal or vertical lines to be drawn free-hand — but this works only with Nidd Valley's own software. In use, I found the Nidd Valley mouse to be slightly less responsive than the other two and its larger size made it feel uncomfortable with prolonged use.

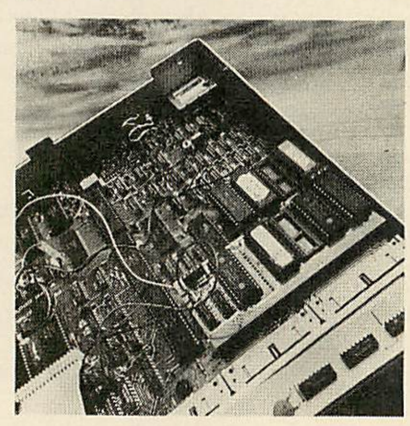
In the end it is really a battle between Watford's Quest Mouse and the AMX Mk III model. They compare favourably on the three Cs — construction, control and comfort.

One alternative to using mice is a Trackerball. These first appeared in military equipment for missile guidance and later, in arcade games such as *Missile Command*. The high degree of movement and accuracy needed has been carried through to the Marconi Trackerball (used by Acorn with its Domesday videodisc system), making it a good tool for use with art packages. The Trackerball is compatible with the AMX mouse and should therefore work with AMS's *Super Art* and Watford's *Quest Paint*.

RAMBOARD

AU OFFER

ROM/RAM Expansion Board



Edinburgh Software Products' Sideways ROM/RAM board is being offered to *Acorn User* readers at a bargain price of only £64.95, a saving of £10.00. The board allows any BBC model B micro's memory to be fully expanded, up to a total of 256Kbytes. Four sideways RAM banks are fitted as standard and the board will accept up to six sideways ROMs (16Kbyte or 32Kbyte chips).

This well-built board simply plugs in to the circuit board, so no messy soldering is necessary. Compatibility is good; unlike some other sideways RAM boards, the user port is not corrupted, and the board works with shadow RAM boards too. It has been tested with a wide variety of software and has worked without problems.

The board is British made and comes with excellent after sales support. A battery back-up upgrade can be fitted to the RAM, as can read/write protect switches.

As written in *Acorn User* when we reviewed the board last month, 'This board rates as one of the best I've seen. The overall quality is excellent – well laid out and robustly made.' You won't find a cheaper or easier way to upgrade your micro's memory than this.

Please note this board is only for the BBC model B.

Please send me ______ ROM/RAM boards at £64.95.

I enclose my cheque/postal order payable to Edinburgh Products Ltd for £ ______
(including Postage and Packing)

NAME ______

ADDRESS ______

POSTCODE ______

Send this coupon with your remittance in an envelope to ROM/RAM Offer, *Acorn User*, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.

TubeLink

EXROM : The Extension ROM

Tubelink's EXROM effectively doubles the size of the BBC's operating system by emulating many of the features that until now were only available to Master owners, in addition to which, EXROM offers...

- Extended Osbyte/Osword calls
- Sideways ROM save/load
- Tube switching on/off commands
- Extended Hi-BASIC environment
- Model B, B+, Master compatible
- Filing system utilities
- UNPLUG/*INSERT ROMs
- Tube memory Transfer
- Full 65C02 disassembler
- Suitable for DFS/ADFS/*Net*

£9.95 on 40/80 track disc • £14.95 on 16k EPROM

UTILRAM: The Utility RAM

At last full emulation of the Master's configuration and Real-Time clock system is available for Model B and B+ owners using Tubelink's Utility RAM. Supplied on 40/80 track disc for loading into sideways RAM. Excellent value at just £9.95.

- Choose start-up mode, drive speed, language ROM, etc
- Set-up screen interlace and DFS/ADFS preferences
- Extended Printer Buffer (upto 63k) and Epson screen dump
- Constantly updated Real-Time clock and calendar
- Compatible with BBC Micro models B, B+ 64k, and B+ 128k

Postage FREE on all items. FREE catalogue on request. If ordering EXROM, please state which version of Hi-BASIC you use, if any. Dealer enquiries welcome. See us at Stand 12, 1987 Acorn User Exhibition. Orders/enquiries to:

Tubelink, PO Box 641, LONDON NW9 8TF

SHADES OF ORANGE, GREY, BROWN AND PINK ON YOUR COMPUTER

The SPX system gives you:

A choice of 4096 colours
16 non-flashing colours in mode 2
Works in all modes (even mode 7)
Easy to fit – requires no soldering
Software on ROM, 10 new star commands
Can be driven from VDU19 . . .
Complex flashing colours
Can be used with ART PACKAGES, GAMES, VIDEO DIGITIZERS etc.
SPX requires an RGB monitor

Model B version	**£54.95 +vat**
Enhanced Master version	**£59.95 +vat**

Saturn Computers
1/12 Avenue Road
DARLASTON
West Midlands WS10 8AR
or phone 021-526 6216 for details

COMING SOON: Palette switching system for the Master SPX giving 8 colours on a mode 0 or 3 screen.

Archimedes Software

Over the past five years Computer Concepts have gained a reputation for leading the software market from the age of the Model-A to the Master Compact. We intend to produce a wide range of quality software for the Archimedes including completely new and original applications and utility software.

INTER-series

Our most popular products have been converted to operate on the Archimedes. Each of these will be available as a full package and, to current owners of the existing ROM versions, as a low-cost upgrade. Files created on the BBC Micro (ADFS 3.5") are immediately compatible with the Archimedes versions. The products available are:-

WORDWISE PLUS

40-column word processor. Features text segments and a full programming language. Very flexible, allowing label-printing, multi-column printing, etc. The most popular word processor for the BBC Micro.

INTER-CHART

Chart plotting. Operates in any Archimedes screen mode. Data can be entered/edited direct, or imported from INTER-SHEET, INTER-WORD, or even from BASIC etc.

INTER-SHEET

Spreadsheet. Operates in 40/80/132 column display modes. Allows up to 255x64 cell matrix. Accepts data transferred from INTER-WORD.

INTER-WORD

'WYSIWYG' word processor. Operates in 40/80/120 character display modes. Accepts data transferred from INTER-SHEET.

Programmers

Writing good software for the Archimedes requires teamwork. In order to develop a larger range of products than would usually be possible, we are looking for competent, experienced programmers. We can offer either fixed contract work or full-time employment. Products developed by us or for us must be of the highest quality and, to this end, all programming *must* be undertaken *purely* in ARM assembly language. Interested applicants are invited to apply (in writing only please) to the 'Manager' at the address below.

If you want to be kept up-to-date on the forthcoming Archimedes products then please write or phone for details.



Computer Concepts

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX Telephone: (0442) 63933

LOW COST ELECTRONICS CAD

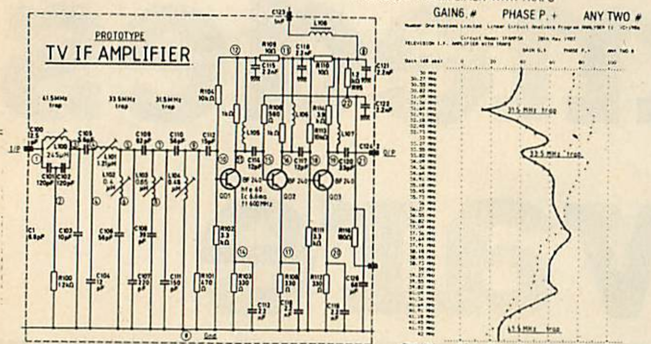
IBM PC (and compatibles) R.M. NIMBUS, BBC MODEL B, B+ and MASTER AMSTRAD CPC and SPECTRUM 48K.

Number One Systems Limited

Linear Circuit Analysis Program ANALYSER II
Circuit Name IFAMP3 30th September 1986

TELEVISION I F AMPLIFIER WITH TRAPS

GAIN6, # PHASE P, + ANY TWO #



ANALYSER I and II compute the A.C. FREQUENCY RESPONSE of linear (analogue) circuits. GAIN and PHASE, INPUT IMPEDANCE, OUTPUT IMPEDANCE and GROUP DELAY (except Spectrum version) are calculated over any frequency range required. The programs are in use regularly for frequencies between 0.1Hz to 1.2GHz. The effects on performance of MODIFICATIONS to both circuit and component values can be speedily evaluated.

Circuits containing any combination of RESISTORS, CAPACITORS, INDUCTORS, TRANSFORMERS, BIPOLAR AND FIELD EFFECT TRANSISTORS and OPERATIONAL AMPLIFIERS can be simulated – up to 60 nodes and 180 components (IBM version).

Ideal for the analysis of ACTIVE and PASSIVE FILTER CIRCUITS, AUDIO AMPLIFIERS, LOUDSPEAKER CROSS-OVER NETWORKS, WIDE-BAND AMPLIFIERS, TUNED R.F. AMPLIFIERS, AERIAL MATCHING NETWORKS, TV I.F. and CHROMA FILTER CIRCUITS, LINEAR INTEGRATED CIRCUITS. etc.

STABILITY CRITERIA AND OSCILLATOR CIRCUITS can be evaluated by "breaking the loop". Tabular output on Analyser I. Full graphical output, increased circuit size and active component library facilities on Analyser II.

Check out your new designs in minutes rather than days.

ANALYSER can greatly reduce or even eliminate the need to breadboard new designs.
Full AFTER SALES SERVICE with TELEPHONE QUERY HOT LINE and FREE update service.
Used by INDUSTRIAL, GOVERNMENT and UNIVERSITY R & D DEPARTMENTS worldwide.
IDEAL FOR TRAINING COURSES, VERY EASY TO USE. Prices from £20-£195.

For further details and example computation or for details on our DRAUGHTING program, please write or phone:

NUMBER ONE SYSTEMS LTD, Dept AU.
Harding Way, Somersham Road, St Ives, Huntingdon, Cambs. PE17 4WR.
Tel: (0480) 61778

SOLIDISK 256k OWNERS

Would you like to run second processor languages on your BBC micro? HiLoad is a software package that lets you do that and more. High quality at a low price – once only offer at £12 inclusive.

Send your cheque to:

David McQuillan
65 Woosehill Lane
Wokingham
Berks RG11 2TR

State whether a 40 or 80 track disc is required. Or send SAE for full details.

COMPUTECK

- ★ NEW SOFTWARE & HARDWARE AT DISCOUNT PRICES
- ★ "TRADE IN" DEALS ON NEW SOFTWARE
- ★ USED SOFTWARE & HARDWARE
- ★ WE ALSO BUY IN YOUR USED SOFTWARE & SOME HARDWARE
- ★ BEEBUG-CLARES-AMX-ACORNSOFT-PACE-WE HAVE THEM ALL

Software for "trade in" or "buying in" must be in original boxes complete with all the appropriate literature.

Send SAE today for Price Lists (over 600 items). If you want to "trade in" or sell let us know what you have and/or want and for which computer. You will here from us by return. This will be the best 13p you will ever spend!!

Instant Mini Office on Eproms * Discount Price	£53.94
Trade in Mini Office 11 for Instant Mini Office	£49.60
Computer Concepts Interword * Discount Price	£45.08
Trade in Wordwise Plus for Interword	£40.25
Second hand Price Computer Concepts Printmaster	£14.47

Plus many, many more bargains.

Prices include VAT : Please ADD 92p p&p UK Mainland
ACCESS and VISA cards Mail Order : Tel. 045 74 65953

Computeck (Dept AU) : 2 Werneth Road : Glossop : Derbyshire : SK13 9LZ

WARNING! Anyone sending "pirated" software on any media will be reported to the software house or author for legal action by them!

DOUBLE PHANTOM?

YES! This IS the program demonstrated on BBC TV's "Micro Live". The Worlds first micro multi-user combat flight simulation is now available direct from DOCTOR SOFT via our 'HOT LINE' FIRST CLASS MAIL ORDER service.

DOUBLE PHANTOM is basically a TWO computer version of the highly acclaimed PHANTOM COMBAT simulation. At least one BBC must have a disc system. A hardware link (included) then links the machines which become separate aircraft sharing the same airspace, each VISIBLE and VULNERABLE to the other!

DOUBLE PHANTOM has all the usual PHANTOM features including the fastest and smoothest 3D colour graphics around (15fps). RAF Phantom pilot Paul Courtnage's verdict: "Marvellous . . . quite the best micro flight simulation I've ever seen . . . Totally captivating!"

Phone: Mail Order Hot line 0903 776000 with VISA/ACCESS. Mail: PO BOX 66, East Preston, West Sussex BN16 2TX. Most orders despatched SAME DAY, FIRST CLASS, POST FREE.

DOUBLE PHANTOM (inc link)		BBC ★	disc	19.95
LINK separately		BBC	cable	9.95
PHANTOM COMBAT		BBC ★	disc	12.95
PHANTOM COMBAT	Electron &	BBC	cass	9.95
747		BBC B only	disc	9.95
747		BBC B only	cass	8.95
747	Electron		cass	7.95
747	Commodore 64		cass	12.95
747	Commodore 64		disc	14.95
747	Commodore 64(USA format)		disc	14.95

(Overseas orders, equiv currency, add air mail at cost)
JOYSTICKS optional with all programs
BBC means all machines from 32k up
★ SPECIFY DFS when ordering discs
£2 discount on multiple order

DOCTOR SOFT – THE FLIGHT SIMULATION SPECIALIST

At last! MODE 7 on the ELECTRON

- –full hardware implementation
- –7 colours, flashing, double height, etc.
- –1k screen (HIMEM at &7C00)
- –same video chips as BBC micro
- –screen POKEs displayed correctly
- –connects between Electron and Plus One/ROM box
- –NO internal modifications to Electron
- –RUNS BBC MODE 7 SOFTWARE, eg. WORDWISE
- **–Price £89 including p&p. etc.**

JAFA SYSTEMS
9, Lon-y-Garwa, Caerphilly, Mid-Glamorgan
For further details, phone 0222 887203

Also still available – the original 'kit' boards for the E2P Second Processor – bare pcb, instructions, and software £15

Coming soon – Electron Speech Unit

ROOM 7 SOFTWARE

POOLS CHEQUE
A useful utility for anyone running a pools syndicate. Store on disc the lines entered on your coupon and when the results are entered the program calculates which line gives the highest score. Multiple printouts gives a copy to each syndicate member.

£12.50
INC. of VAT
BBC & MASTER
DISC ONLY.

SOCCER BOSS
This great football management simulation game offers the challenge of taking your team through league fixtures, the F.A. cup, Littlewoods cup, and for anyone good enough, European competitions.

Also available – Easy Banker, Introduction to Statistics, Investment Analyser 2, Matrix, Central Heating calculator, Electrical cable selector and Structural beam Calculator. Details on request.

£11.95
INC. VAT
BBC & MASTER
DISC ONLY.

Letters/cheques to: W.L. Computer Services, First floor, H.S.L. Building, 437 Warrington Road, Rainhill, Merseyside L35 4LL. Tel. 051-426 9660



HARDWARE

VIDEO BY NUMBERS

Digitisers let your computer use complex images without drawing. Malcolm Banthorpe looks at two popular models

Video digitisers provide a way of converting a video picture from a camera or video recorder into a form that can be used by the computer. In November 1985 I wrote about video digitisers in general and the RH Electronics digitiser in particular. Since this unit is now unavailable, I have looked at two more digitisers, from Data Harvest and Watford Electronics.

Digitisers employ, as part of their hardware, an analogue to digital converter which is generally capable of resolving either 64 or 256 levels of grey within the picture. As the micro is capable of displaying only up to eight levels (or 16 in some cases, if pixel dithering is used), the choice of exactly which levels out of the 256 or 64 are displayed, is made by the digitising software. In neither of the units looked at was this choice easily changeable by the user: this would be a major drawback for some applications.

With only four or eight levels available it's impossible to achieve any degree of subtlety in the shading. If you look at the pictures accompanying this article, you'll see one way I found of achieving a smoother shading effect.

This effect was achieved by deliberately operating the camera under very low light conditions, which in turn required that the digitiser be operated at a high gain setting. This tends to make the pictures very 'noisy' with lots of random dots. Although video noise would be considered as something to avoid in most situations, it can be turned to advantage with a digitiser of the simpler type. By deliberately using a noisy picture source, the hard boundaries between the four levels in mode 1 pictures are softened by a random dithering effect. The result gives a more pleasing pictorial effect – rather like a grainy photograph.

Data Harvest's Video Interface comes in a black plastic case, approximately six inches by four inches by one inch and has a separate, compact power supply with an integral 13-amp plug.

The rear panel has a BNC socket for video input, a power input jack and a 20-way socket, for connection via ribbon cable to the BBC micro's user port. The front panel has red, yellow and green LED indicators marked respectively, 'power', 'sync' and 'busy', and two screwdriver adjustment slots marked 'sync' and 'gain'.



The Watford digitiser can produce images like this Coke can

With a video signal present at the input socket and the sync control set fully clockwise, the yellow lamp should glow. The control must then be backed off as far as possible, while keeping the lamp glowing steadily. Depending on the signal source, this adjustment can be quite critical: if it's set too high, the digitiser can trigger on a sharp brightness transition in the picture rather than on its sync pulses. This is particularly the case when trying to capture a frozen frame from a domestic video recorder. Once set up for a particular video source, no further adjustment should normally be required.

The gain control may need more frequent attention, according to the picture content, to obtain optimum results. I would prefer to have seen a proper rotary control with a knob on the front panel, rather than a screwdriver slot for this particular adjustment.

Software is entirely on disc and gives the following options: capture image, load from disc, save to disc, change mode, change palette, load or save palette, invert image, dump screen to printer.

At any point, pressing Escape will display the current image captured while the space bar will return you to the menu.

The software default to mode which gives only four grey levels, but modes 0, 1 and 2 can also be selected, according to the resolution and number of grey levels required. This gives up to 16 levels in mode 0, with 160 x 128 pixels resolution. In mode 1, seven levels are possible, eight in mode 2.

In modes 0 and 1 resolution has been sacrificed to allow more grey levels to be represented by means of pixel patterns.

I found that too much colour saturation in the source picture could cause problems of patterning and distorted grey levels.

The manual supplied, as well as giving general operating instructions, has a



"THERE'S NOTHING AS TEMPTING AS OUR PRICES"

NARROW DOT MATRIX PRINTERS

Epson LX800 - The Brand New Best Seller!	£195
Star NL10 - The Number Two Seller-Best Spec	£195
Panasonic 1081 120cps & 80 col - Brand New!	£149
Panasonic 1091 - Byte Magazine Says It's No 1	£228
Epson FX800 - Brand New! 240cps! Wow!	£298
Epson EX800 - 300cps & 80 column-Super Fast!	£385
Seikosha MP1300AI - 300cps!	£299
MP 165 - Cheap Fast And Good Quality 180cps	£170
MP 135	£135
Oki Microline 182 - The Number 2 Brand	£188
Oki Microline 192 - Perennial Favourite	£282
Citizen MSP 10 - 160cps draft 80 column	£277
Citizen 120D - 120cps draft 25cps NLQ	£165
Citizen MSP20 - 200cps draft 50cps NLQ	£299

WIDE DOT MATRIX PRINTERS

Star NX15 - The New Wide-body NL10!	£288
Star NR15 - Replaces the SR15-A Great Mover	£424
Panasonic 1595 - The Panasonic Favorite	£521
Epson FX1000 - Brand New! Replaces FX105	£385
Epson EX1000 - 300cps & 136 column-Super Fast!	£517
Seikosha MP5300AI - 132col Version of MP1300	£439
MP 200 - 200cps! 132 column!	£260
MP 201 - 132 column 200cps	£295
Oki Microline 193 - Worth A Look	£366
Oki Microline 293 - Worth A Long Look	£608

24-PIN DOT MATRIX PRINTERS

Epson LQ800 - Letter Quality-24 Pin Printhead	£423
Epson LQ1000 - Letter Quality-24 Pins-132 Col	£577
Epson LQ2500 - This one is really good!	£694
Star NB15 - The big, up-market Star 24-pin 300cps	£679
Star NB24-15 - Same as above, but 216cps	£525
Star NB24-10 - 80 column 24-pin winner	£415
NEC P6 - Good Buy	£389
NEC P7 - One of the Best Sellers Ever - 24 pin	£447

DAISY WHEEL PRINTERS

Star Power Type 18cps - The Current Cheap One	£179
Juki 6100 - 20cps - Very Popular	£254
Juki 6200 - 30cps - Still Popular	£397
Juki 6300 - 40cps - Very Up-Market	£660
Juki 6500 - 60cps - Heavy Duty and Very Fast	£966
Qume Sprint 11/90 - 90cps Daisywheel Printer	£1200
Citizen HPQ-45 45 cps	£499
Citizen Premier-35	£510
Brother HR25	£549

COLOUR PRINTERS

Okimate 20 Thermal Printer	£159
Juki 5520 - The Market Leader - Fast!	£335
Epson EX-Series Colour Option	£55
NEC P565XL - Heavy-Duty Office Favorite!	£744
Epson LQ2500 Colour Option/Makes LQ2500 Colour	£55
Seikosha MP1300 Colour Kit/Makes MP1300 Colour	£87

INK JET PRINTERS

Epson SQ2500 - Ink your jet with this one!	£988

PLOTTERS, DIGITIZERS & LASERS

New Oki Laserline 6 - 6 pages per minute	£1459
HP LaserJet II - Newer, Better, Cheaper!	£1945
Cherry A3 Digitizer	£475
Roland DXY-880A Plotter - Best Value A3 Plotter	£649
Roland DXY-990A Plotter	£1099
Epson GQ3500 - Brand new Epson best-seller!	£1359

CABLES AND THINGS

IBM-Compatible Centronics Parallel Cable (Round)	£12
BBC Centronics Parallel Cable (Ribbon)	£8
Serial Cables Made to Order	£20
Two-Way Printer T-Switch	£45
Three-Way Printer Switch	£79
Fan-Fold White Paper, 11in long, 1000 sheets	£7
80 Col Printer Stands	£21
132 Column Printer Stands	£28
SpaceBase Adjustable Floor-Standing Printer Stand	£85

AMSTRAD PC

Amstrad 1512 Single Floppy/Mono Monitor	£415
Amstrad 1512 Double Floppy/Mono Monitor	£525
Amstrad 1512 Single Floppy/Colour Monitor	£555
Amstrad 1512 Double Floppy/Colour Monitor	£666
Amstrad 1512 20mb Hard Disk/Mono Monitor	£837
Amstrad 1512 20mb Hard Disk/Colour Monitor	£959
Amstrad 1640 Single Floppy (EGA Colour 640k)	£759
Amstrad 1640 Double Floppy (EGA Colour 640k)	£854
Amstrad 1640 20mb Hard Disk (EGA Colour 640k)	£1139

MACDOUGALL PC's

MacDougall 286 AT 512k 10mz/20mb HD/mono monitor	£999

EPSON PC's

Epson PC+ 640k RAM, 20mb Hard Disk, Video Card	£950
Epson PC AX-20 AT 640k RAM, 1.2mb Floppy, 20mb HD	£1499
Epson PC AX-40 AT 640k RAM, 1.2mb Floppy, 40mb HD	£1899
Epson PC AX-60 AT 640k RAM, 1.2mb Floppy, 60mb HD	£2399
Epson PC AX-80 AT 640k RAM, 1.2mb Floppy, 80mb HD	£2799
Epson PCe	£1050

OLIVETTI PC's

Olivetti M24 Single Floppy Base Unit/640k	£799
Olivetti M24SP 20mb single floppy Base Unit/640k	£1199
Olivetti M28 AT Compatible - 20mb Hard Disk	£1831
Olivetti M28 20mb Hard Disk with 20mb Tape Back-up	£2299
Olivetti M28 40mb Hard Disk, 640k RAM	£2325
Olivetti M28 40mb Hard Disk with 20mb Tape Back-up	£2796
Special Offers:	
M24 20mb Computer System	£1299
M24SP Complete System (Monitor/Keyboard/DOS)	£1499

SHARP PORTABLES

Sharp PC7100 20mb Hard Disk SuperTwist Screen	£1399

COMPAQ

Compaq Portable III Model 2 640K/20MB HD	£2824
Compaq Portable III Model 3 640K/40MB HD	£3136
Compaq Deskpro 286 Model 20 640K/1 FD/20MB H.D.	£2161
Compaq Deskpro 386 Model 40 1024K/40MD HD/Tape Bk	£3999

MONITORS

Dyneer 12in 12MHI Mono Monitor & Tilt/Swivel Stand	£99
Eizo ER8042S 14in Ultra-High Res EGA Colour Monitor	£465
ADI 14in Mono Monitor with Tilt/Swivel Stand	£120

ATARI

Atari 520STM 512k RAM, TV Modulator, no disk drive	£199
Atari 520STFM 512k RAM, disk drive, mouse	£299
Atari 1040STF 1mb RAM, disk drive, mouse, no monitor	£430
Atari 1040STF with Mono Monitor, 1mb RAM, disk drive	£529
Atari 1040STF with Atari SC1224 Colour Monitor	£720
Atari 1040STF with Phillips 8833 Colour Monitor	£670
Atari 1040STF with Phillips 8852 Colour Monitor	£674
Atari SF314 1mb Floppy Disk Drive	£150
Atari SF354 512k Floppy Disk Drive	£118
Atari SH204 20mb Hard Disk Drive	£478
Cumana CS354 1mb Floppy Disk Drive	£116
Atari SM125 High Resolution Monochrome Monitor	£114
Atari SC1224 Colour Monitor	£296

ATARI TOP SELLING SOFTWARE

Flight Simulator II - Very Realistic Best Seller	£36
VIP Professional (Lotus Clone Gem Version)	£149
Metacomco Lattice C Compiler	£71
Metacomco Macro Assembler	£37
First Word Plus - Word Processor with Graphics	£62
Art Director - State of the Art Drawing Package	£35
Film Director - Powerful Animation Package	£45
Art + Film Director - Perfect Partners	£75
Easy Draw II - The Powerful Drawing Program	£57
Fast ST Basic (ROM) - The Fastest, Most Comprehensive	£66
Degas Elite - The Market Leader	£59
Mark Williams 'C' Compiler	£117
Superbase Personal - The Most Advanced Easy to Use Database	£84
ChessMaster 2000 - The Finest Chess Program with Speech	£33
Leaderboard - Realistic Golf Simulator	£18

CATS 'N' MICE

Mouse Systems Mouse with Pop-Up Menus & PC Paint	£145
Mouse Systems Mouse with Pop-Up Menus Only	£125
Microsoft Bus or Serial Mouse - Don't forget the cat!	£132
Logitech Logimouse Plus Package	£89

DISKETTES

Computer Express 5.25in DS/DD 48tpi disks	£1.00 each
Computer Express 5.25in DS/DD 96tpi disks	£1.40 each
Computer Express 5.25in DS/DD 96tpi Hi-Density	£1.85 each
Computer Express Branded 3.5in DS/DD diskettes	£1.99 each

COMMUNICATIONS

Miracle WS4000 V21-V23 Modem	£139
Miracle WS3000 V22 Professional Modem	£385
Sage Chitchat Comms Pack (Modem/Software/Cable)	£199
Crosstalk IV Comms Software	£93
Sage Chitchat Comms Software	£71
One-To-One Electronic Mail Subscription	£20
RS232 serial modem cable	£15

HARD DISKS

Dysan/Western Digital 20mb File Card	£289
Miniscribe 30mb Scribecard Hard Disk Card	£325
Seagate 20mb Hard Disk Kit with WD Controller & Cables	£235
Plus HardCard 20mb	£595

ADD-ON BOARDS

AST SixPack Plus 64k memory Multifunction Card	£169
Qubie SixShooter Multifunction Card 64k memory	£125
Intel AboveBoard with 0k installed	£225
Everex Mini Magic Ram Expansion Card (384K)	£117
Hercules Graphics/Graphics Plus Card	£179
Everex EverGraphics Plus (Clone Hercules Card)	£95
Eizo Auto-Switch EGA Card	£219
Paradise Auto-Switch EGA Card	£235
AST Rampage	£200
AST 3720 Terminal Emulation Card	£649
AST 5251 Model 12 Remote Emulation Card	£525
AST 5251 Model 11 Local Emulation Card	£600
AST SixPack Premium 256k Clock Parallel & Serial	£330
AST SixPack Premium 1mb EMS daughter board	£150
AST Advantage 128k Serial parallel Port	£400

CHIPS, CO-PROCESSOR AND DRAM

64k dRAM chips (nine to make 64k)	£1.15 each
256k dRAM Chips (nine to make 256k) 150 N.S.	£3.00 each
Intel 8087 5mz Maths Co-Processor	£97
Intel 8087-2 8mz Maths Co-Processor	£139
Intel 80287-8 Maths Co-Processor	£189

TOP IBM-COMPATIBLE SOFTWARE

WordStar 2000 release 2	£229
WordStar 3.4	£149
WordStar Professional Version 4	£193
WordStar 2000 Plus	£269
Wordcraft	£299
Word Perfect ver 4.2 - The Number 1 WP Package	£239
Microsoft Word ver 3 - Number 2 WP Package	£249
Multimate ver 3.31	£189
Multimate Advantage II	£290
Lotus Manuscript - Latest Blockbuster WP Package!	£236
PFS: First Choice	£110
Framework II Version 1.1	£312
Symphony version 1.2 (Latest Version)	£319
Lotus 1-2-3 ver 2.1 Top Selling Package In The World	£223
Supercalc ver 4 - The Celebrated Lotus-Beater!	£195
Grafox Logistix	£80
Javelin	£343
Smart System - The Best Intergrated Package	£349
Executive Systems X-Tree (Super Friendly HD Organizer)	£40
Pegasus Accounts (per Module)	£199
Psion Chess - You too can play like Gary Kasperov	£25
Quaid Software Copywrite (Back up Protected Software)	£35
Microsoft Flight Simulator - Don't crash!	£39
Funk Software Sideways	£40
Borland Turbo Lightening	£47
Microsoft Windows	£59
Norton Utilities 4	£52
Ventura Desk Top Publisher	£399
Freelance Plus	£269
Delta Professional	£325
Ansa Paradox II - Multi-User Database!	£299
Cardbox Plus	£225
Ashton-Tate Rapid File	£199
dBase III Plus - Best Selling Professional Database	£335
FoxBase Plus	£269

LOW-COST SOFTWARE

VP Planner by Paperback Software - Best Seller!	£61
VP Info (dBASE II Clone)	£62
VP Expert	£75
Borland Sidekick - The Original Co-Resident Process!	£49
Borland Turbo C - C How You Like This!	£65
Borland Turbo Pascal - The Classic Borland Product	£47
Sage Bookeeper	£75
Sage PC Planner Spreadsheet (Lotus Clone)	£71
Sage PC-Write Word Processor	£71
Sage Accountant	£110
Sage Accountant Plus - Top Selling Cheap Accounts	£155
Sage Payroll	£85
Sage Financial Controller - Just reduced from 995!	£240
Personal Word Perfect	£149
Word Perfect Junior	£80
Microsoft Word Junior	£62
WordStar 1512	£60
Multiplan Junior	£62
Supercalc 3	£60
Amstrad Reflex	£60
Migent Ability - Top Integrated Package	£50
Migent Ability II - Spend a Little More, Mate!	£135
Words & Figures - Lotus 123 v1 Clone with WP	£80
Gem WordChart	£89

SPECIAL OFFERS

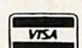
Epson PC+ 20mb with Eizo 8042S EGA Monitor & Card	£1489
Epson PC+ 20mb with Mono Monitor	£989
Migent Ability	£50
LX-86 Auto Sheet Feed	£39

All prices exclude VAT and delivery. Prices are correct at the time of going to press although they are subject to change without notification. Official purchase orders welcome. Full back up and support. Open Monday to Friday 9am-6pm. Open Saturday 10am-4pm

FOR FULL PRICE LIST PLEASE CALL
TELEPHONE ORDERS WELCOME



0727 - 72790/37451



SINGLE AND MULTI-USER
MICRO-COMPUTER
SOFTWARE SALES AND SUPPORT

***SHOWROOM* • 99 PARK STREET LANE • BRICKET WOOD • HERTFORDSHIRE • AL2 2JA • ST ALBANS (0727) 72790**
TELEX: 8950511 ONE ONE G (Quote Ref: 15412001)

OFFICE AND WAREHOUSE • UNIT A • CAXTON CENTRE • PORTERS WOOD • ST ALBANS • HERTFORDSHIRE • AL3 6XT • (0727) 37451

COMPUTER EXPRESS HOLLAND • NIJVERHEIDSWEG • N60 • 3812 PM • AMERSFOORT • NETHERLANDS • (33) 630544

number of hints for those wishing to write their own software. There is also a brief discussion of image processing with some useful equations for the more technically minded and a book list for those wishing to pursue the matter further.

Watford's machine

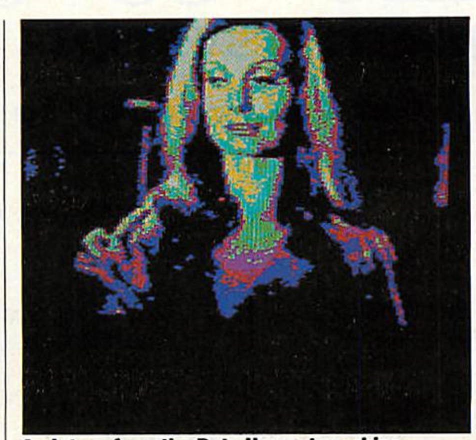
Watford's Beeb Video Digitiser comes in a very compact box measuring approximately four inches by five inches by two inches. Its connection to the BBC micro is via the user port and the unit takes its power from the micro's own supply via this connection. Power consumption is about 300mA, which should cause no problems normally, but may be pushing things a bit too far if there are already other peripherals connected to the internal power supply.

The software to drive the digitiser is supplied as a ROM and offers eight commands to create and manipulate images, all of which may be called either direct from the keyboard or from a Basic program.

As with most digitisers, the picture can come from almost any video source; a camera or recorder are the most obvious choices. Most cameras, either colour or black and white, can be used but a few older or very cheap models which have random interlace are not suitable: it would therefore be wise to check with a dealer if you're not sure whether your own model falls into this category.

A three-position switch on the front panel of the digitiser allows it to operate with screen modes 0, 1 or 2. The resolution and number of the grey levels in the digitised image is directly related to the number of colours available in the screen mode chosen: colours rather than pixel patterns are used to represent the different levels. Therefore mode 0 gives 640 by 256 resolution with two levels, mode 1 gives 320 by 256 resolution with four levels and mode 2 gives 160 by 256 with eight levels; the eight flashing colours are not used. The time taken to capture a picture is just under two seconds. So in the case of a video recording, a freeze-frame facility will be necessary, unless it is a specially shot scene without any movement. A video recorder giving a steady freeze-frame without jitter is essential for good results.

The front panel of the unit also has two rotary controls by means of which the



A picture from the Data Harvest machine

black and white levels of the image can be controlled. This helps to make best use of the limited grey scale, by making the darkest parts of the picture black and the brightest parts white.

Automatic control of these levels by the hardware is also available and while it works well to give a reasonable result quickly, I found that in most cases it was worthwhile taking time to set up the levels manually for optimum results.

The ROM software includes two screen dumps with shading for use with Epson-compatible and Acorn/Olivetti Spark Jet printers. Images in any of the screen modes produced by the digitiser can be saved to the current filing system, without loss of detail, in a compressed form. The amount of disc storage space saved will depend on the amount of detail in the picture; whereas 20k would normally be required for any of these modes, an average picture may well be reduced to 12k or possibly as little as 1k for a very simple picture. The mode 1 pictures which accompany this review, all of which contain quite a lot of fine detail, showed savings of 3k to 6k each when saved using this compression routine.

Images stored in compressed form will only be displayable on a machine containing the Watford ROM, as the appropriate data expansion routine is required, but there is nothing to stop images for general use being stored in the conventional manner, for example:

```
10 MODE 1
20 REPEAT
30   *IMAGE
40   UNTIL INKEY-33
50 *IMSAVE PICTURE
60 END
```

For those who have an AMX mouse, the ROM allows pictures in any of the digitiser's three screen modes to be masked and converted into mode 4 screens ready to be loaded into the *AMX Art* program, either to be modified or to serve as the basis for a sketch. In this case the colours in the original picture are converted into black and white pixel patterns in mode 4.

This digitiser represents quite good value for money, the price being at a level likely to be considered affordable by many home users. It works well, given a good video source. The ROM software offers the sort of routines that most home users are likely to find attractive.

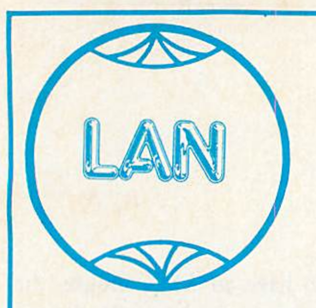
Each of the digitisers appeared very similar in hardware performance. The main differences were in the software supplied. Again, each version was reasonably easy to use and in no case was it difficult to achieve quite pleasing results – given a good video source. Consequently it's difficult to recommend a model, as whichever is more suitable will depend on your application. The choice of graphics modes, resolutions and grey levels may make you choose one over the other.

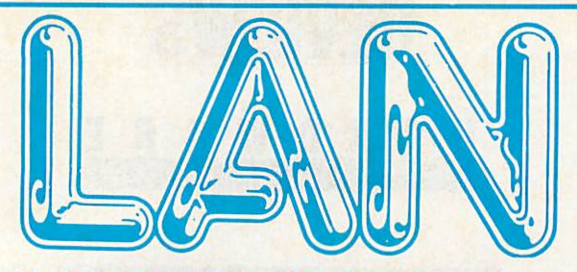
The Data Harvest unit, while more expensive, would probably be most suitable for serious industrial or educational applications where some degree of image processing and analysis is required. This unit also comes with menu-driven software which demands no knowledge of programming, whereas the Watford unit needs a minimal understanding of the subject.

My own choice for home use would probably be the Watford unit as it would satisfy most of my requirements for a digitiser at reasonable cost. The black level and gain controls were easier to use. I also liked the way that the picture capture and manipulation commands can easily be incorporated into the user's own programs. On the negative side is the lack of information in the manual for those who wish to write their own software at assembler level.

Video Interface is available from Data Harvest, 28 Lake Street, Leighton Buzzard, Beds LU7 8RX. Tel: (0525) 373666. Price: £174 plus VAT.

Beeb Video Digitiser is available from Watford Electronics, 250 Lower High Street, Watford, Herts. Tel: (0923) 37774/40588. Price: £109 plus VAT.







COMPUTER SYSTEMS LTD

Bringing the World of Technology to your fingertips

TOP TEN

MASTER 128 K
Complete with internal software and manual
£339.00

PANASONIC KXT1081
Complete with paper and BBC Cable
£149.00

CSX 400
Cumana 40/80 track switchable disc drive
£109.00

NEW EPSOM LX800
150 cps, 25 at NLQ
£199.00

3½" DISC DRIVE
Cumana CS354 drive with power supply unit
£89.00

LAN 510
Box of ten 5¼" diskettes, DSDD, 96 TPI in plastic library case suitable for 40 and 80 track drives.
£8.65

CSX 100
Cumana CSX 100 40 track drive
£589.00

PLINTH DRIVE
Dual 40/80 track drives horizontally mounted in monitor stand to fit both BBC & Master Series
£232

MICROVITEC 1451
Medium resolution colour monitor
£219.00

ZENITH MONITOR
High resolution green or amber monitor
£69.00

RING NOW EDUCATION CATALOGUE AVAILABLE

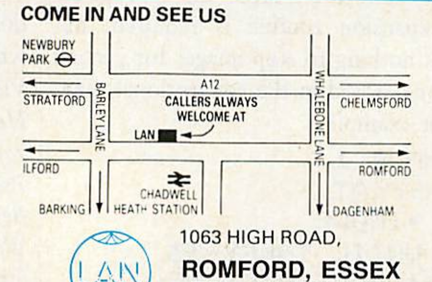
DRIVES		PRINTERS		MONITORS		MISC	
Cumana Drives		EPSOM LX800	£199	MICROVITEC 1431	£179	MASTER COMPACT	£349
CSX100	£89	MP201	£289	MICROVITEC 1451	£219	MASTER TURBO	£99
CSX400	£109	MP165	£179	PHILIPS 8833 (stereo)	£239	MASTER 512	£179
CS400	£129	EPSON LX86	£199	PHILIPS 7502	£79	1770 DFS	£49
CD800	£219	STAR NLIØ	£199	PHILIPS 7522	£85	8271 DFS	£79
CS354	£89	PANASONIC 1081	£149	ZENITH 1230	£69	PRINTER STAND	£15
CS358	£169	CANON PW1080A	£229	ZENITH 1220	£69	MASTER EPROM CART	£12
Winchester Drive		EPSON FX86	£349	TAXAN 620	£269	AMX MOUSE	£69
V20MB	£599	MP26	£249	MASTER MONITOR STAND	£15	IEEE INTERFACE	£199
Plinth Drive		JUKI 6100	£279	SWIVEL STAND	£16	CHOLO	£12
VPLIN	£232						

LAN VOUCHER

£1.00 OFF EVERY £10.00

off software purchased in the computer centre

COME IN AND SEE US



LAN

1063 HIGH ROAD,
ROMFORD, ESSEX
TEL: 01-597 8851

HOW TO ORDER

Post order form to us.
Telephone orders accepted if confirmed in writing.
All orders will be acknowledged.
Goods can be collected or delivered.

DELIVERY CHARGES
Below £10 add £1.50 — Below £50 add £2.50
Below £100 add £3.50 — Above £100 add £8.00

PRICES EXCLUSIVE OF V.A.T. AND CORRECT AT TIME OF GOING TO PRESS.



Education callers ask for:
Tony Judge or Mike Brown



REVIEWS

BOOKS

WHAT A LOVELY VIEW



'View' by Bruce Smith, Dabs Press, £12.95

At last! Just when we'd almost given up hope, a comprehensive guide for *View* users has arrived – and not a moment too soon. All we've had until now has been Acornsoft's reference guides, which fall far short of explaining how to stretch the word-processor to its full capacity.

But patience has finally been rewarded. Our saviour is the indescribable, the indefatigable, the indefensible but never indolent Bruce Smith. (We'll explain the long words to you later Bruce.)

Called simply *View*, it comes from a new publishing house, Dabs Press. It's the first of what is promised to be a series of Dabhand Guides. This inaugural effort includes not only an extensive introduction and tutorial on *View* but also covers *ViewSpell* and *ViewIndex*, written in the usual cheerful Smith style.

Acorn is not providing proper guides to *View* or *ViewSheet* with new Masters or Compacts – demanding instead you to shell out for its guides – the Dabhand alternative is a better option.

This is the first computer book I've read in bed for pleasure rather than to cure insomnia. In fact it's even had me springing out from under the duvet after midnight, bounding back downstairs to try out some of the tips included within its 248 pages.

The book begins with an easy-to-follow introduction then proceeds to explain step-by-step, plainly and simply, how the various features of *View* operate.

Even if you already have Acornsoft's *Into View*, the new Dabhand reference should still teach you a lot you did not already know and provides an equally useful tutorial for *ViewSpell* and *ViewIndex*. At last, even I understand how printer drivers work – I think.

For experienced *View* users, the most immediate benefits are the utility listings – though it's probably easier to buy the program disc which accompanies the guide for an extra £7.95 (DFS 5.25-inch disc) or £9.95 (ADFS 3.5-inch disc) to save errors.

Included are a printer driver generator, a front-end *View Manager*, a shadow ROM image for *View Help* and several other helpful knick-knacks.

Bill Penfold

PROGRAM IN PASCAL

'Pascal Programming', by Chris Hawksley, Cambridge University Press, £5.95

The majority of home micro owners learn Basic and nothing else. It's the language that comes with the machine and, having been introduced to the arcane world of programming in this way, it's difficult for people to switch to other languages later.

For that reason, most introductions to programming are based on Basic. That's why Chris Hawksley's book is such a pleasant change. He's writing mainly for college students who need some computing knowledge to support their main subjects. So Hawksley was not restricted in his choice of language, and his decision to go for Pascal is a logical one – it's a widely available language with a lot of features to recommend it to learners, not least because it encourages well-structured programs. The version of Pascal used in the book is the ISO standard version, which is available on the BBC micro.

The book serves as both a good introduction to Pascal and as an easy way into programming in general. People who already have a reasonable knowledge of Basic programming will find it a little slow going at first, but by putting programming concepts in the context of another language it helps to shed a new light on them.

Even if you go back to Basic after reading the book, you're likely to write better programs – especially as BBC Basic has a number of Pascal-like features.

Steve Mansfield

DATA ON DATABASES

'Brit-Line', EDI, £40

On-line information retrieval abolishes the problem of finding sources. Electronic searching means time spent combing reference tomes is saved but, more importantly, searches which would be impossibly complex to do manually are easy.

Even at £40 a copy, or £75 for a twice-yearly subscription, a reference work like *Brit-Line* will quickly pay its way for anyone involved in extensive research. Its 376 pages contain pointers to hundreds of databases and the cross index is an invaluable aid to research.

It opens with the basic information needed to go on-line. This covers types of terminal and information format, a jargon glossary and background features on issues around electronic information retrieval.

One such is Strathclyde University librarian Lizzie Davenport's account of her first encounter with ALANT, the American Library Association Network. 'And the devil, taking him up into a high mountain, showed him all the kingdoms of the world', but 'an hour or so of running time . . . convinced me that the network was a force for good'.

The meat of the book is the 326-page directory. It is divided into categories from agriculture to veterinary science. The general information category ranges from the British Library's *Blaise-Line* to a joke database. Sub-headings include host/producer, subject, content, cost, the quantity of information and frequency of update and the book includes an example of what you get from each database.

Special sections cover electronic mail and miscellaneous on-line services – an on-line book ordering service and a commercial information exchange service feature here.

For serious searching, the indices at the back are invaluable. One may search by information producer, database, host (the parent database organisation) or, most usefully, using the cross index. This is divided into the major topics of the front contents page, but defeats the problem of rigid sub-divisions. For example, the database *Geoarchive* appears under earth sciences, energy, and life sciences. Database addresses and electronic mailboxes are included.

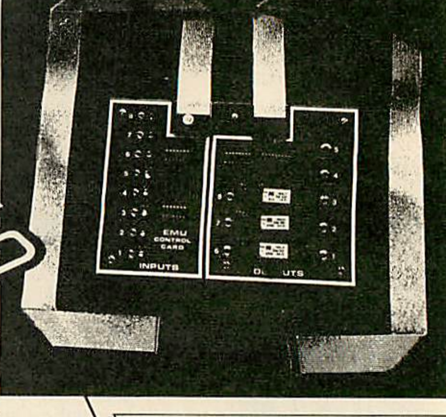
Potential users include journalists, business people, scientists, teachers and anyone who needs information. Contact EDI, Westlands Cottage, Green Lanes, Shipley Bridge, Horley, Surrey RH6 9TG. Tel: (0293) 773675; Telecom Gold 76:SJJ 161.

Manek Dubash

OFF-BOARDS FOR ELECTRONIC *SYSTEMS* DESIGN

An exciting development in the field of educational microelectronics. Unlike other 'push together' systems boards with limited flexibility, you'll find the OFFBOARDS truly open-ended, ideal for design problem solving. They provide an essential stepping stone to the complexities of pure breadboarding. With the OFFBOARDS you can introduce a component-based approach without the usual drawbacks of lost time on simple wiring faults. Each of the ten OFFBOARDS consists of a small PCB with a set of Veropins fitted to one end. These can be pushed into a standard I.C. type breadboard, and powered up to provide a useful systems function. The Veropins of the OFFBOARDS mate with the sockets of the breadboard, and pupils can investigate the circuits sub-systems by using the breadboard to interconnect and adding components.





CONTROL CARD

Another very useful tool for problem solving exercises and computer control studies, the CONTROL CARD will shortly be available alongside other group products. Ideal for introducing the computer as a device controller, and solving problems in a control environment. The pcb CONTROL CARD with eight inputs and eight outputs has been extensively trialled in both secondary and junior schools. Used with In Control software facilities can be taught quicker, allowing much more time for posing and solving problems. The CONTROL CARD connects to the user and printer ports of the BBC Microcomputer.

£149.95

TREKKER

DIGITAL ELECTRONICS TASTER COURSE

Provides an inventive and stimulating introduction to digital electronics. The six-hour course, with its guided discovery approach, offers pupils valuable practical experience in handling microelectronic components. Secondary teachers contributed to its design, and helped with trialling.



The taster course contains a re-useable self-contained kit, requiring no special environment or mains supply. It allows teachers with little or no previous knowledge to create the first awareness of modern micro-electronic technology, and stimulate an interest for further studies. Some of the areas covered by the course include recognition and use of resistors and capacitors, current flow, a lamp flasher circuit with audible alarm, binary to decimal conversion with automatic/manual counting and decimal display.

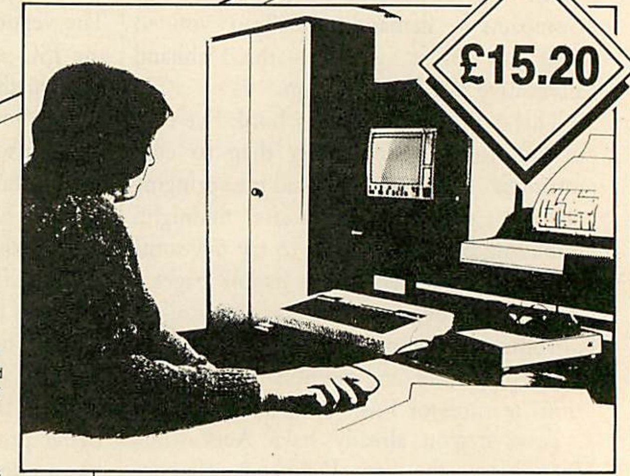
FROM £59.95

BBC MICRO INTERFACING COURSE

An inexpensive guide to using the BBC Micro-computer as a monitor/controller of various devices. The eight-hour course follows a set of Pupil Worksheets, from BASIC program writing to controlling the 'loco' of an N-gauge model railway. Central to the course is the versatile interface card, with 19 in/out sockets, which connects the BBC Micro-computer user port.

TREKKER

The complete educational robotics package. Designed by a teacher for other teachers to use in their class-rooms. *TREKKER* is supplied ready-built with a complete survival pack of courses on computing, electronics and robotics. Just plug into your BBC user port, and start in less than three minutes. *TREKKER* is the best way to introduce new technology into the curriculum. No programming knowledge is required as the pack includes 44 ready-to-use software programs. Applications range from geometry to electronics, white line following to bar codes, and from music to distance measuring. *TREKKER* embodies components, circuits and design techniques from public syllabuses in Control Technology, Modular Technology, Electronics and Robotics. If you want to be in control of technology, keep on the right track with *TREKKER*.



PRINTED CIRCUIT BOARD DESIGNER

Designing printed circuit boards with computer aided design provides many advantages for both teacher and pupil. It's quicker, cheaper and easier to use than traditional tape and transfer methods. Using the PRINTED CIRCUIT BOARD DESIGNER the layout can be changed at any stage of the design. Good physical co-ordination is no longer necessary to produce a neat and accurate p.c.b. mask. Once you've used this program to design a p.c.b. you'll soon be attempting more and more complex circuits. Tapes, transfers and strip-boards will become things of the past. The dot-matrix printouts of your designs can be used to make either single or double sided printed circuits.



Clwyd Technics Ltd
Antelope Industrial Estate
Rhydymwyn, Mold, Clwyd CH7 5JH
Telephone: Hendre (035283) 751

Educational prices quoted, excluding V.A.T.

EDUCATION

NEWS

News in brief

■ Fearnleaf's latest 24-page catalogue has just been issued containing a variety of new releases including *Castle Under Attack*, *The Normans: Resources Pack* and a series of compilations of educational software. It points out that all its packages are now available for all of the versions of the BBC micro.

■ Ega Beva Software, which was taken over a little while ago by SESS in Bristol, is on the move again. Meyers Leisure Products has taken over the entire catalogue of Ega Beva products. The titles range from nursery to computer studies, and many support the Concept Keyboard. Meyers intends to cut prices sharply and there will be further discounts for quantity orders. Concept Keyboard users may find this company a good source of materials if they have not already tapped into it.

Contacts

Topologika, PO Box 39, Stilton, Peterborough, PE7 3RL. Tel: (0487) 831153.
Meyers Leisure Products, Turners Tower, Faulkland, Avon BA3 5UP. Tel: (037387) 459.
The Historical Association, 59a Kennington Road, London SE11 4JH. Tel: 01-735 3901.
Fearnleaf, 31 Old Road West, Gravesend, Kent DA11 0LH. Tel: (0474) 359037.
Soft-Teach, Sturgess Farmhouse, Longbridge Deverill, Warminster BA12 7EA. Tel: (0985) 40329.

Out to get the giants

The first release from a new company – Topologika – is *Giantkiller*. It is based on Jack and the Beanstalk, which seems inappropriate for the 10 to 14 year-old target age group, but all the puzzles are based on fundamental mathematical activities: calculator work, spatial investigations, co-ordinates, tessellations, topology and map work. The program was written by Peter Killworth, who is best known as the author of the early Acornsoft adventures such as *Philosopher's Quest*.

Topologika claims that the program will replace favourites like *L* and others in the junior/secondary age range.

The program loads in its entirety into memory and therefore the disc may be booted up in a number of machines at the same time. With the program disc there is a 24-page teacher guide complete with detailed maps and all the answers plus a 16-page children's guide with copyright-free worksheets and keycard. The package costs £16 for all BBC micros and £18 for the Compact.

Symbolic science

Users of micros for scientific purposes will welcome the *Sciways* ROM from Mahew Telonics, which allows the printing of over 350 science-based characters on the screen Epson-compatible printer. It supports chemical and mathematical symbols, the Greek alphabet, superscript, subscript and user-defined characters. The package links into its wordprocessors and may be accessed from Basic. It costs £33.50 for the BBC B, B+ and Master 128.

```
  H H   O
  | |  /
H-C-C-C
  | |  \
  H H   OH
```

$\Delta H^{\ominus} \approx -241$ kJmol^{-1}

$\int_0^{2\pi} \theta^2 \; d\theta$

Useful symbols from *Sciways*

Quite right

Soft-Teach Educational has just released its new introductory wordprocessor – *Quite-Write*. The package has been developed with an English teacher doing research at Bath University into the effect of wordprocessing on children's writing. Classroom experiences in the use of wordprocessors have been taken into account, and Soft-Teach reckons that its package provides a straightforward and non-threatening environment for introductory work in this area.

The package, costing £20, operates in mode 7. Most of the editing options are displayed on-screen as and when they are needed. It comes with exercises, available both on workcard and disc, which help beginners come to terms with such topics as 'Move and Copy', and 'Delete, Insert and Find'. There are supplementary exercises which encourage the user to develop the skills learned earlier in real situations.

Computers – a thing of the past

The Historical Association's recent report *New History and New Technology* explores curricular issues and the range of information available on classroom practice and materials.

The authors conclude that new technology can improve the quality of teaching, and can enable information to be handled efficiently – particularly important in an information-rich subject like history. In addition they believe it encourages cross-curricular activities, and helps in the effective presentation of information.

New History and New Technology is concise and readable, and should be useful to IT advisers in persuading their history-teaching colleagues of the advantages of computer-based teaching.

PLAY THE GAME

Computer games aren't just for fun – they can be valuable educational tools in the classroom

Chris Drage and Nick Evans

Computer-based adventure programs can generate a creative and imaginary world in the classroom. Experimentation with ideas, discussion, formulation and sharing of strategies, drama and simulation all feature largely in adventure programs. Traditional drill-and-skill teaching has no place in the exciting world generated by the micro. The micro is better used by teachers in a resource-based approach to education, in which children are actively learning and where teachers are not actively teaching. But for success the teacher must be prepared to adopt a managerial role: the micro is used to make the classroom a much more exciting and stimulating environment.

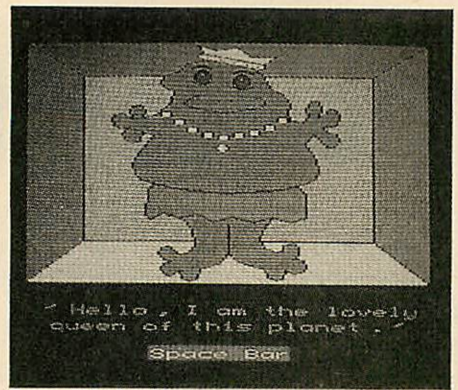
What are the most important criteria for selecting a good adventure program for use in the school environment? We can identify four important points:

- The content must be fresh and completely original
- The content should encourage work across the curriculum
- The software design and materials should meet the needs of large groups of children, not just individuals
- The software should encourage a good deal of work away from the computer

During the past year a number of adventure packages for children have become available which fulfil all of these criteria. This month we take a look at a few of the best of these, and give some general tips for their use.

Balance

Adventures for low attainers are difficult to come by. *Farm* from NORICC attempts to redress the balance. Being entirely Concept Keyboard based, children must explore a colourful overlay depicting a farm scene, in order to collect food from around the farm. A variety of problems have to be solved to enable all the possible foods to be collected. The program aids the development of reasoning, problem solving, reading and comprehension skills. *Farm* will certainly encourage group discussion, co-operation and decision making among nine-year-olds and above, and indeed it's equally challenging for the more able of younger children.



***Space Mission Mada*'s entertaining graphics**

Those who have enjoyed *Droom* from RESOURCE can now revel in its sequel: *Dust*. This is an adventure program specifically aimed at supporting a thematic approach to the curriculum, both in terms of creative, linguistic and mathematical experience, and in terms of transferable skills and processes. *Dust* provides primary teachers with an excellent vehicle with which to integrate mathematics into all areas of the curriculum. Although the program is set in the context of a story centred around the planets in the solar system, progression through most of it depends on the solution to a number of problems and puzzles. Like *Droom*, each of the 13 'chapters', spread over four discs, is a module of work by itself. If children fail in a task there are practices provided on a supplementary disc to give them further experience with a particular type of problem. Importantly, each chapter may be tackled independently – unlike many adventure programs, children are not sent back to the beginning to try again, but are given a chance to persevere at the task until they solve it.

Sherston Software has followed the success of its excellent *Wizard's Return* with two mathematical adventures: *Animal Rescue*, aimed at six to eight-year-olds, and *Space Mission Mada*, suitable for nine to 13-year-olds. The former program comprises three parts plus a 'problems practice section'. A nasty troll has stolen an animal from the animal park. The children's task is to recover the animal, solving mathematical problems on the way. The thought and care that have gone into the design of *Animal Rescue* show in the small details – eg, providing a vocabulary list for a wall display. Featuring delightful graphics and a simple input routine, *Animal Rescue* will prove a valuable resource particularly for infant and primary schools. *Space Mission Mada* resembles *Dust* in its concept. Children must fly from a distant galaxy to earth in order to save a little girl's school from threatened closure – Sherston Software believes in keeping its themes current! There are wonderful graphics, and a wide range of well-presented, mathematical puzzles and problems must be solved during the journey. This package not only complements work on an outer space theme very well but could also be used in a wide range of other classroom contexts.

Problem solving

Selective Software has also released a number of mathematics-based adventures over the past year which encourage a wide range of problem solving activities. *Little Red Riding Hood* is aimed at five to eight-year-olds. It needs only very simple input routines and presents a good range of appropriate problems to solve along the way. Surprisingly, the Concept Keyboard is not catered for. Selective uses mode 7 teletext graphics in all its adventures and *Cuthbert Catches a Cold* (six to nine-plus years) is no exception. A great deal of thought and effort has gone into those in this package, and they are both motivating, and well supported by additional materials and ideas for use. Animated graphics and the accompanying story book both help establish the scenario, and children soon develop an empathy for Cuthbert, so they are well motivated to attempt the problems and puzzles they are presented with.

Shylock Gnomes (10-plus years), has many features common to *Cuthbert*, but is cast more in the style of traditional adventure programs. As the determined (but fearful) Shylock roams freely through Dracula's castle he must overcome all manner of fiendish mathematical problems. Many

ideas are suggested in the handbook for development across a broad range of curriculum areas.

Longman Micro Software has not been slow to produce an excellent mathematical adventure game suitable for upper primary school children. *Kingdom of Helior* is different from most adventures in that each attempt is unique, there being no single solution. As each game is a new game children must find strategies for play rather than merely learn the particular positions of clues, hazards and treasures. The children must search a magic island for the treasures of Helior. The island is divided into three parts, which must be searched for treasures. Passwords must be discovered to enable each part to be explored. To gain these the children must solve mathematical puzzles and problems. These are found in the pupils' books as tasks one to six (each set of tasks corresponds to a level of difficulty). The tasks are varied and involve numerous aspects of mathematics. The pack contains three A4 pupils' books, a teacher's manual and two discs. The quality of the materials is excellent and the software transfers smoothly to Econet. A utilities disc allows both the scenario and tasks to be altered and modified to suit the needs of the children, and it transforms *Kingdom of Helior* into a truly content-free program. Children are able to write personalised adventures for their chums to solve!

Chalksoft and Nene Valley Publishing have teamed up to produce a multi-media pack of resource materials for eight- to 12-year-olds based on the life of the legendary King Arthur. At the core of *Arthur* is an adventure program in which the children are invited to join in the quest for the Holy Grail. Success in this adventure depends not only on solving problems, but also on choosing the right knight supporter at the right location (based on each knight's 'personality'). The support materials include taped stories, transparencies (plus taped commentary), project cards and copy sheets – impressive indeed. Although the level of reading difficulty of the cards will preclude younger children, *Arthur* is a complete set of activities which can be used immediately with conveniently little or no modification by the teacher.

4Mation is a name synonymous with high quality adventure programs for children. *Dinosaur Discovery* and *Zoopak*, two new additions to the range, will not disappoint. The former program has not been produced in-house, but has roots in Australia where it is marketed by Jacaranda Software. Essentially, the children's task is to solve problems in order to gather all the articles necessary to collect a dinosaur egg and successfully incubate it. The graphics, puzzles and support materials are certainly up to the standard we have come to expect from 4Mation. Documentation is excellent, providing ideas for further development, a teacher's guided tour and listings for various practice programs.



***Animal Rescue* – for six to eight year-olds**

Zoopak is a major resources pack providing a starting point for a zoo project. Comprising five programs (three problem-solving programs, a wordprocessor and database), activity sheets, zoo information and Concept Keyboard overlays, there is enough material provided to cover a wide range of ages and abilities. If you had previously thought of a school zoo visit as simply a look-and-fill-in-a-worksheet session, then *Zoopak* will definitely open your eyes to a variety of imaginative new approaches to the topic.

Interaction

To make the most of any of these adventures – or any others – our experience shows that children should be grouped in threes or fours to maximise computer time and encourage group interaction. The result is that children can discuss options and draw upon a larger fund of ideas. It is important to encourage children to discuss strategies and ploys, not to accept things at face value but to seek verification. Failed strategies should be seen as a group problem and the suggestions of every member should be valued equally.

Make sure that each group has a balanced composition. Girls must be allowed full opportunity to contribute as should the shy, reserved boy. Particularly dominant children must be encouraged to exercise restraint. The success or failure of a group can depend on the teacher's skill in putting the right children together.

Computer time will be a problem in most schools. This is why the best adventures must encourage back-up work away from the micro. It is vital that a program can be used in the context of a twice-weekly computer session, and so support materials are vital as well.

Although many packages have a taped or printed 'story' to introduce the scenario, teachers must keep in mind that the children's age, ability and previous experience with adventure programs will determine the real starting point. Quality adventure packages tend to be expensive items. Choosing software which has been purchased in bulk by your local education authority adviser can be one way to lessen the financial burden. All schools should be able to manage to purchase two or three adventures to cover a suitable age range.

Finally, if any of the packages mentioned in this article are to succeed then they require a capable and enthusiastic teacher to bring them to life. Next month we will look at the practicalities of using one of these adventure packages in the classroom and suggest a range of supporting materials to help you get the most from it.

Farm *for the BBC B, B+ and Master 128, £11.50 + VAT (disc), Northern Region Information Consortium Centre (NORICC), Resources Centre, Coach Lane Campus, Coach Lane, Newcastle upon Tyne NE7 7XA.*

Dust *for the BBC B, B+ and Master 128, £20.95 (disc), RESOURCE, Exeter Road, Off Coventry Road, Doncaster DN2 4PY.*

Animal Rescue *and* Space Mission Mada *for the BBC B, £18.40 each (disc) Sherston Software, 8 Court Street, Sherston, Malmesbury, Wiltshire SN16 0LL.*

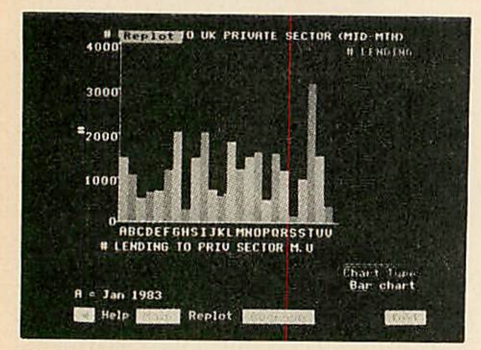
Little Red Riding Hood, *£7.50 (disc),* Cuthbert Catches a Cold, *£19.95 (5.25-inch disc) or £21.95 (3.5-inch disc),* Shylock Gnomes, *£7.50 (disc) all for the BBC B, B+, and Master 128, Selective Software, 64 Brooks Road, Street, Somerset BA16 0PP.*

Kingdom of Helior *for the BBC B, B+ Master 128, £32.00 + VAT (disc), Longman Micro Software, Longman House, Burnt Mill, Harlow, Essex CM20 2JE.*

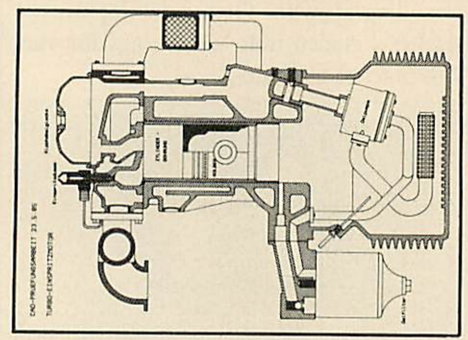
Arthur *for the BBC B, B+, Master 128 and Master Compact. £29.95 + VAT (5.25-inch disc) £31.95 (3.5-inch disc), Rickitt Educational Media, Ilton, Ilminster, Somerset TA19 9HS.*

Dinosaur Discovery *£16.00 + VAT (disc),* Zoopak *£21.00 + VAT (disc), for the BBC B, B+, Master 128 and Master Compact, 4Mation Educational Resources, 'Linden Lea', Rock Park, Barnstaple, Devon EX32 9AQ.*

Every PLOTMATE picture tells a story



DOMESDAY
A typical bar chart from the Domesday database. Hard copy is obtainable via the Plotmate BBC Welcome disk.



CAD
Example from SUPERDRAFT running on the NIMBUS.



DIGITISING
Map of Europe digitised and edited using LINMAP software.

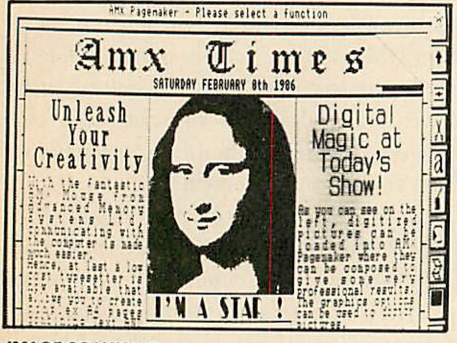
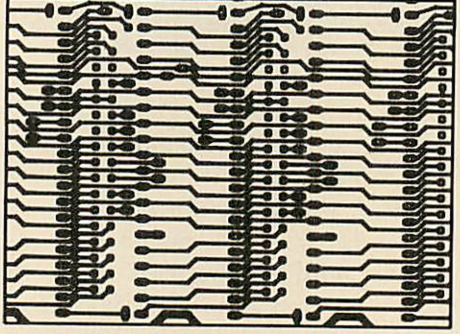


IMAGE SCANNING
Linscan screen file of 'MONA LISA' incorporated into AMX PAGEMAKER.



PCB DESIGN
Using LINTRACK, a Printed Circuit Board design package.



ESS
Linear Graphic's unique educational discount scheme.

PLOTMATE is one of the most popular graphics plotters used across the entire curriculum in education.

Sophisticated and inexpensive, Plotmate provides high definition plotted output and high resolution scanned input when used in conjunction with the LINSCAN Image Scanner.

MICRO COMPATIBILITY
Plotmate is compatible with all leading micros including the BBC, NIMBUS, IBM PCs and PC compatibles, such as the AMSTRAD PC1512.

CAD
Plotmate runs from many leading BBC packages including BITSTIK, AMX DESIGN, the REALTIME GRAPHICS SYSTEM and LOGOTRON LOGO. When the on-board graphics language range is extended, Plotmate 'M' models understand commands from HPGL 7475A/7470A industry standard languages enabling compatibility with a wide range of professional third party software including AUTOCAD, AUTOSKETCH, SUPERDRAFT, SCRIBE MODELLER and MICRODRAFT.

PCB DESIGN
LINTRACK is a sophisticated, low cost, CAD package which allows the creation and revision of printed circuit board artwork. BBC, Nimbus, IBM PC and Amstrad PC1512 versions available.

IMAGE SCANNING
The LINSCAN range of image scanners can create image files for most popular Desktop Publishing and Art packages.

AMX PAGEMAKER, FLEET STREET EDITOR, IMAGE, ARTROOM and ACE can process image files created by Linscan (for the BBC).

ALDUS PAGEMAKER and NEWSPAPER can use image files from Linscan (for the Nimbus).

GEM PAINT, XEROX VENTURA PUBLISHER, and GEM DESKTOP PUBLISHER can utilise image files created by Linscan (for IBM PCs and PC compatibles).

DOMESDAY
All Plotmate Welcome disks allow WRITE Files containing tabular data from the Domesday database to be reprocessed in pie, bar and line chart format on the BBC Master.

EDUCATIONAL DISCOUNTS
Linear Graphics offers the unique Educational Support Scheme (ESS) whereby savings of between 20%-30% on all Plotmate plotters, associated software and add-ons are available to all educational establishments. FREE training is offered with quantity orders.



PLOTMATE
LINEAR GRAPHICS LTD
28 Purdeys Way Rochford Essex SS4 1NE
Tel 0702 541663/4/5 Telex 995701

Please send me details on Linear Graphics' products. I am particularly interested in (please indicate)

NAME..

POSITION..

ESTABLISHMENT..

ADDRESS..

....

....TEL............................ AU9

BUSINESS

SPECIAL EFFECTS

You can create printer drivers to allow unusual effects for *ViewSheet*

Graham Bell

The Acorn *Printer Driver Generator* can be used to create printer drivers for the *View* family. These allow special highlight codes specifying printer effects to be put in your text. When the time comes for printing, the printer driver translates the highlight codes into the relevant control codes for the printer. As various types of printer demand different control codes to start, say, underlining, you use a separate printer driver for each printer. This allows the same piece of *View* text to be printed out on any type of printer, without modification, just by using a different driver.

Printer drivers can also be used with *ViewSheet*. Highlight codes can be attached to the printer window definitions:

```
Wi TopL BotR Pos Cw Bw Fmt  Opt
PO A1   E17       8  6 D2RM TS2
```

The 2 under Opt shows the window should be printed with highlight 2 set; that is, in bold.

This way, you can use two effects on the spreadsheet; underline and bold. With *View*, you can use extended highlight sequences to give other effects, but this isn't possible with *ViewSheet*.

However, you can create extraordinary printer drivers that allow unusual effects to be used for special *ViewSheet* models. The technique is to lie to the generator.

The first type of special effect can be applied to the whole of the print-out. One of the difficulties of using spreadsheets with a printer is that many sheets exceed the maximum width of the printer. Most printers are only 80-columns wide. Using a dot-matrix printer, this restriction can be lifted by selecting a condensed font, which usually gives up to 132 characters across the paper on an 80-column printer. The condensed font must be switched on before printing commences by sending the relevant control codes to the printer.

This can be achieved by specifying the necessary control codes when using the generator to create a printer driver. You type in the codes when the generator asks for the printer initialisation codes. For example, the following answer will make an Epson FX80 or compatible printer set condensed mode when the printer driver initialises it:

Include printer initialisation?

Y

Give code sequence for initialising the printer:

ESC "I" 1 15

The 'ESC "I" 1' is the standard initialisation code for an FX80 compatible printer. It allows the pound sign to be printed using control code '6'. The extra '15' code sets condensed mode. Answer all the generator's other questions as usual.

The initialisation code is sent by the printer driver to the printer every time printing is started. Other effects can be selected in a similar way: the printer could be set to NLQ mode for example, by including 'ESC "x" 1' in the sequence. This should be 'ESC "("' for Kaga 810 and Canon PW1080 printers.

If necessary, complex sequences of up to a maximum of between seven and 21 separate codes can be entered into the initialisation routine (the actual maximum depends upon what codes are entered!).

Another type of special effect concerns the whole of an individual printer window. Highlight options one and two are normally attached to a printer window definition, and cause that window to be printed in bold or underlined. If, for example, a combination of bold face and italics is needed instead, then press 'Y' in reply to the generator's 'Include underlining?' question, but give the codes for italics when the generator asks for the underline on and off codes. Answer the other questions in the normal way: press N in response to 'Include italics?' and also superscript and subscript, as there is no way to use them with *ViewSheet*.

When this special driver is used to print out a spreadsheet, if highlight option one is set for a printer window, the window will print in italics, even though the driver thinks it is using underlining.

Lying about the ASCII code that prints the three special characters – hash, dollar and pound signs – allows printing of any other special characters that the printer provides. For example, just put hash on the sheet. The printer driver will translate this to the altered code, and the printer will print the special character.

For example, a degree symbol (°) can be printed on an Epson FX80 or compatible printer by specifying code 5:

Give the code(s) to obtain #:

5

Using this, a degree symbol can be printed by using the hash on the spreadsheet.

Another way to use these special characters is as alternative highlights. If you specify the control codes to start italics for the pound sign, and the italics stop codes for the dollar sign, then pound and dollar can be used on the sheet to switch italics on and off. So:

```
123 £456$ 789
```

would print as:

```
123  456  789
```

If you do this, it is best to include a space character at the end of the italics control codes like this:

Give the code(s) to obtain £:

ESC "4" " "

This ensures that the columns line up.

TEMPERATURES

°C	°F
0	32
2	36
4	39
6	43
8	46
10	50
12	54
14	57
16	61
18	64
20	68
22	72
24	75
26	79
28	82

NLQ, italics and the degree symbol together

"THE PICK OF THE BUNCH"

16K SIDEWAYS RAM

* Module uses low power CMOS RAM
* Write protect switch now supplied for trouble free operation
* Software provides full ROM load/save facilities
* Formats programs for the ROM Filing System
* RAM can be configured as a 15.5K printer buffer
* Excellent documentation
* A machine code patch allows Assembly language programmers to use the 65C02 instructions

Price: 16K RAM £22.50
Please specify 40 or 80 track disc when ordering. Educational discount given.

As an independent review put it . .

"IFEL's manual is a pleasure to use . . ."

"The model with the most features at a reasonable price, and therefore the pick of the bunch, has to be IFEL's."

Beebug May 1986

Send cash with order/official order, or write for further details to:

IFEL, Dept. (AU) FREE basic tool-kit for use in side-ways ram with every order taken

36 Upland Drive, Derriford, Plymouth PL6 6BD

Telephone (0752) 787058



ACORN USER ADVERTISEMENT PAGES – SEPTEMBER 1987

3" HITACHI DISK DRIVES

Suitable for use on the Amstrad 6128, 664, Tatung Einstein, BBC with DFS. 40 track, double density, 3 ms track access time. Unformatted capacity — single sided 250k. Shugart interface. Plug compatible with 5¼ inch drives.



Cables available for connection to:
Amstrad — **£7.50** plus VAT.
BBC — **£7.50** plus VAT.
Tatung installation pack — **£12.00** plus VAT.

CARRIAGE £3 + VAT.

PRICE: **£24.95** + VAT

FOR FURTHER DETAILS SEND S.A.E. TO:

MATMOS Ltd., Unit 11, Lindfield Enterprise Park, Lewes Road, LINDFIELD, West Sussex, RH16 2LX. Tel. 0444-73830/0444-414484/0444-454377

Or **Computer Appreciation,** 111 Northgate, CANTERBURY, Kent CT1 1BH. Tel. 0227-470512

BeebDOS version 1.10 — from MicroBoss

Software for BBC and IBM file interchange

Runs on IBM-PC-XT-AT or compatibles and supports DOS 2.0 or later
Supplied on 360k IBM diskette with manual and plastic wallet the software includes:

BCOPY	Copy files BBC-IBM, IBM-BBC, BBC-BBC (wild cards allowed)
BCONV	Flexible IBM file translate facility enabling text to be passed between VIEW, WORDSTAR and Displaywrite 3 amongst other uses.
BGRAPH	Convert BBC mode 0,1,4,5, screen format (AMX Art included) files to IBM standard colour (CGA) for use in presentations.
BCAT	Catalogue BBC disks
BFORM	Format BBC disks (boot option & title can be specified)
BBACK	Backup BBC disks
BWIPE	Delete BBC files (wild cards allowed)
BACC	Lock or unlock BBC files (wild cards allowed)
BCOMP	Compact BBC disks
BREN	Rename BBC files
BTOPT	Alter the tile or boot option of a BBC disk

Complete package for £35 INCLUSIVE

BBC double density diskette formats supported are Watford, Solidisk, UDM, and OPUS DDOS, Acorn single density DFS is only supported when running BeebDOS on an IBM AT or XT286 fitted with a 360k disk drive. Please send for an information sheet.

CHEQUE OR POSTAL ORDER ORDER TRADE/EDUCATIONAL ENQUIRIES WELCOME
MICROBOSS LTD 3 HADLEIGH RD FRINTON ESSEX CO13 9QQ TEL (02556) 71095

S P I D E R 2

REAL-TIME CONTROL FOR THE BBC MICRO

Watch the SPIDER!
* *Powerful new BASIC commands for invoking PROCs from the User Port, Serial Port or the Keyboard.*
* *8 independent countdown timers.*
* *Easy to install with no soldering.*
* *Comprehensive manual supplied.*

New SPIDER 2 features
* *Special keywords for controlling the Serial Port.*
* *Professional implementation of Foreground/Background processing.*
* *Reaction timing and pulse trains accurate to 0.1 milliseconds!*

from £65 including VAT

SPIDER 2 is a RAM/ROM combination which uses none of the BBC's memory, so BASIC programs are unaffected. The BBC B+ is fully supported and we supply a complete range of digital, analogue and serial interfaces for use with SPIDER using the 1MHz bus. Ask now for details.

SPIDER — stamps out I/O bugs

NOW AVAILABLE FOR BBC MASTER

Paul Fray Ltd
Willowcroft, Histon Road, Cambridge CB4 3JD
Telephone: (0223) 66529

AA211

contex

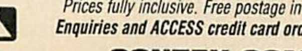
BANK MANAGER is the most advanced and versatile personal bank account program for all BBC computers. *"Data entry is a delight. . . professional . . .excellent product" Micro User.* 36 separate accounts, 9999 standing orders, 99 analysis codes, thousands of transactions, budgets, graphics, foreign currency support, screen and printed reports, report writer, password, recovery and much much more. STANDARD BANK MANAGER for the BBC and BBC+, disc only **£17.50.**

MASTER BANK MANAGER with many more facilities including ADFS, sideways RAM, 40/80 column screens. Only for the BBC Master and Compact computers **£22.50.**

BANK MANAGER BUSINESS UTILITIES adds trial balance and programmable spreadsheet reports to both Standard and Master Bank Managers for business users **£12.00.**

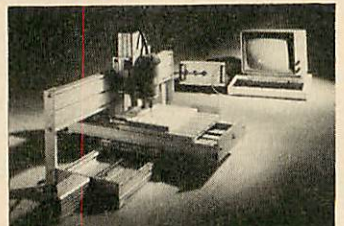
TYPING TUTOR. The recommended way to learn touch typing. 90 smoothly graded lessons and many facilities and options. Disc or tape **£12.50.**

All orders should specify disc format required, 40 or 80 track, 5¼" or 3½".
Prices fully inclusive. Free postage in UK (overseas add £2.50).
Enquiries and ACCESS credit card orders telephone 023 03 347.



CONTEX COMPUTING
15 WOODLANDS CLOSE, COPLE, BEDFORD MK44 3UE

LOW COST XYZ TABLES



N.C. Work Station for Drilling, Routing, Engraving etc.
200 mm x 300 mm x 100 mm XYZ table and controller from £2400.
Outputs from 'STARCAD', 'LINTRACK PCB' or any other software using MOVE, DRAW or PLOT commands can be sent to the machine via RS.232 link

LEEWOOD DEVELOPMENTS LTD
UPTON, CAMBS.
TEL (0480) 890860 (24 Hr)



FREE ADS

Penpal wanted to swap info, must have disc drive. Details Jeremy Coen, 42 Cheviot Road, Millbrook, Southampton SO1 4AA. Tel: *(0703) 778790.*

Serious BBC penpal wanted to exchange info. Must have disc drive. Write to: Mark Thompson, 42 Glenward Avenue, Lennoxtown, Scotland. Tel: Lennoxtown 311443.

Need help with your BBC? Want a contact? Then contact me for hints and tips for your BBC computer. Contact Avtar Singh, 35 Stanmore Place, Lidget Green, Bradford BD7 2EN.

BBC B with DFS 0.90, *Wordwise + Word Aid*, Mitsubishi D/S 40/80 disc drive, joysticks, Microvitec 1451 col monitor, Star Gemini 10X printer, games inc. *Elite*, books, paper, discs plinths, £600 ono. Tel: 01-508 1453.

BBC B 1.2 OS, good condition, £300 worth of games, including *Elite, Sentinal, Repton 1* and *2*. Good condition, £198. Tel: (0742) 667828, Sheffield.

Electron, mint condition, tape recorder, leads, joystick and interface, manual, games, dust cover, magazines. 12 months old, £120. Tel: (0222) 759872.

Viglen single sided 40/80 track switchable disc drive, £70. Tel: (0702) 521903 ask for Simon.

Music 500, £45 ono. Includes leads and extra software (suppled on any medium). Contact Steve on (0243-69) 6666, evenings only.

Burroughs 5-inch green screen monitor, 12VDC comp video, £35. Tel: Colchester (0206) 330775 (Bill).

Electron, tape recorder, leads, lots of software and magazines including *Elite* and languages. All as new, only £130. Tel: (0226) 753160.

Electron Plus One (printer joystick etc, interface) new, boxed, £35 ono. Tel: 061-432 7456, (John).

Grafpad 2 new style with Master software. Boxed, unused, unwanted gift, £45 or swap for Marconi rollerball. Tel: Salisbury (0722) 23205.

6502 second processor, £50, as new. Tel: 01-471 9644, anytime. Also has anyone a Z80 ROM for sale or swap?

Acorn Electron, £60. Plus One, £20. *View, ViewSheet* cartridges, £10 each. Books and manuals free. £90 secures everything. Tel: Mark, 051-733 2370.

Torch Z80 second processor, two dual 80 track drives, perfect software, £300 ono. Acorn Master ROM sockets, £5. Dr Jowitt, Tel: (0252) 22521.

Master 128/512 computer, monitor, twin disc drive, printer, complete business software system, worth £1850. For quick sale £1400 ono. Tel: (0865) 244834.

BBC B OS 0.9, DFS, 40 track single-sided drive, Epson printer, Sanyo monitor, sideways RAM, data recorder, *View*, discs, manuals, £499. Tel: (0742) 680968.

Colour monitor: Microvitec 1451 medium resolution, £230. Tel: 01-940 0896.

Untouched 400k 40/80 track drive and PSU, DS, bundled software, £85. Microvitec Cub, RGB/TTL analogue monitor, med-res, £175. Offers welcome, Mike: 01-586 4982.

Cumana CS100, 100k single sided 40 track disc drive, PSU, cased, 2 drive cables, manual, boxed, little used, £70. Phone: Wokingham (0734) 788193.

Torch Z80 card complete with perfect software, BBC Basic (Z80) and all manuals, £160 or exchange for Music 5000. Tel: (0742) 459165.

Printer/plotter, Tandy CGP 115, four colour, with five 4.25-inch paper rolls, vgc, £40, ono. Tel: Hornchurch (04024) 41593.

Cumana 89 file Electron disc interface, unused. Exchange modem or other equipment. Towse, Mweya, Budock Vean Lane, Falmouth, TR11 5LG.

Electron, Plus One, AP4 disc interface, 80 track double-sided drive, data recorder, monochrome monitor, *View*, etc, £300. Tel: (02556) 6199, evenings and weekends.

Microvitec 1451 colour monitor £175, *Starstore II* database, unused, £20, Electron Master RAM board (kit), £40. Tel: (078 571) 3855 (evenings).

Plus 3 ROM Box Plus, T2P3 and twenty discs, full of programs, boxed as new, £175. Electron, tapes books and magazines, £70. Tel: (0272) 852702.

BBC B, OS 1.2, *Speech*, DFS 0.90, 2 double sided 40 track disc drives, data recorder, 16+ discs, 85+ games, manuals, magazines, excellent condition, £470 ono. Tel: Maidenhead (0628) 22921.

For sale, 37 issues of *Acorn User* and eight other BBC magazines, £20 for the lot. Phone (0993) 850 974, after 6pm.

Forth manuals (two), De Grandis-Harrison, *Functional Forth*. Boris Allan, *Forth Language*. All three for £10. Tel: (0604) 405184, (Northampton).

Electron with upgraded Plus One ROM Box AP4. ROMs: *View, ViewSheet*, ADT, T2P4, games, magazines, manuals. Offers approx £240. Tel: Lincoln 730268.

Solidisk 2 meg 32k RAM board, £32. Kaga KP810 printer, £165. *Superart* package, £32. *Pagemaker* package, £32. Digimouse wanted. Tel: 01-968 3454.

BBC B 1.2 OS, 0.9 DFS, double-sided 40/80 track drive, Delta 14C joystick, 20 discs, manuals, magazines, excellent value, £380 ono. Tel: Grimsby 827942.

Printer Epson FX80, immaculate condition. First offer £65 secures. Phone: David Fulton 01-455 0337.

Volex teletext adaptor, latest ROM (1.4), £55. Watford ROM/RAM card 128k, £60. *Aviator* disc, £10. All as new. Tel: (0629 82) 2197.

Electron First Byte joystick, Quickshot, software, mags, all leads etc, £70. Call: 01-654 9275, weekends and ask for David. Offers?

Magazines *AU* (1985), *Micro-User* (1984, 1985), *PCW* (1983, 1984, 1985) – £1 per year. Buyer collects. Tel: Maidenhead (0628) 23610.

Atom 12k +12k, sound board, ROM Box with ROMs, FP ROM, incomplete disc pack and information. Price: £95 ono. Tel: 01-940 5635.

BBC B, Oak case, dual 5.25-inch drives, Solidisk 256k, Z80 system, dual DFS/ADFS, software, all inclusive, £650, ono. Cannot split. Tel: 021-358 7572. 7.30pm-10.30pm

Twin Teac 100k drives, excellent condition, £95. Watford DFS 1.43 kit complete plus manual, discs, £35. Tel: Chris, Reading 598379.

Wanted fairly new Replay system, not more than a year old. Good condition. Contact (0527) 72732, after 6pm.

Wanted dot-matrix printer, Epson, Kagan or WHY. Must be good quality with parallel interface and tractor-feed. Tel: (0756) 5156 (eves).

BBC B, 1.2 OS, Basic II, Watford 1.30 DFS, dual single-sided 80 track disc drives, mouse and GDump ROMS, Zif socket, joysticks, 20 discs, many games and utilities, £350. Tel: (0865) 61249.

Data General Nova mainframe, CPU, hard disc drive, floppy disc drive, power supply, 6 foot cabinet. Offers invited. Tel: 021-472 3688.

Shinwa CP80 dot-matrix printer, £100. Mouse and *Super Art*, £45. Tel: (0224 575695, after 6pm.

Electron with disc interface, manuals, *View, ViewSheet*, software, games, ROM Box, Plus One, £250 ono, will split. Tel: (0480) 55115, after 6pm.

BBC B 1.2 OS issue 4 Voltmace Delta 14B joystick, driver/cassette, *Elite, Vu-Calc, Chess, Mini Office*, Basicode user guide, Welcome, 7 books, £250 ono. Tel: Bruce Castle (038 789) 211, evenings.

Twelve-inch high resolution amber Taxan monitor, vgc, £65 delivered. Also Z80 second processor, package complete, £150 delivered. Telephone: Gerry on (0779) 8422.

Star commands for Queudata DWP1120 owners, details from Ian Shanks, 22 Bramley Drive, Offord Darcy, Huntingdon, Cambs PE18 9SF. Phone: (0480) 812017.

Run American software, VS, MOS and VS Basic, 32k ROM, £35. Roger Roth, 1237 Beechwood Lane, Menasha, Wisconsin, 54952, USA.

BBC B 1.2 OS, Watford DDFS, Watford 32k shadow RAM board, Peartree 4 ROM expansion board, *View, Spellcheck*, mint. £250. Tel: (0760) 22587, evenings.

BBC B dual floppy disc controller 1770, plus 8271 Solidisk fourmeg 256k, Basic 4, *View* 3.0. Tel: (0582) 606641.

Printer: Brother HR5 thermal transfer, hardly used, in original box, 30 cps, extra ribbons, paper, bargin £30. Tel: Daniel on 01-427 9508.

Wanted: manual for Arabic ROM for the BBC micro. Contact Khairul, Southampton, (0703) 584530, after 6pm.

Acorn User magazines for sale: issues 23 to 56, good condition and complete. Offers. Phone: (0624 84) 2910.

BBC B 1.2 O.S, issue 7, cassette deck, software, £190. Tel: 061-226 4331, after 5pm.

Micro transmitter kit, size: 3"×1"×½" with up to a one mile range. Transmits on VHF/FM bands onto a domestic radio. Only £12.95. Julian Cox, 11 Cheswick Drive, Gosforth, Newcastle-Upon-Tyne NE3 5DF.

BBC B printer, disc drive, ISO Pascal, SWR 32, Speech upgrade, *Pagemaker*, Digimouse, *Wordwise*, £300 + software. Cost £1,225 +, sell for £760 ono. Tel: John, 01-699 3134.

ACORN Z80 second processor, all manuals and software including word-processor, database, spreadsheet, nucleus, Cobol. As new, £220. Tel: Ascot 27951.

Electron Plus One, *View, ViewSheet*, Hopper cartridges, twelve games, Commander 3 joystick interface. All less than six months old, £75. Tel: (0222) 755250.

Solidisk SWR 256, £80. Solidisk DFDC, £20. *Spellmaster* 128R ROM, boxed, £30. Must sell. Darren Sillett, 1 Prospect Avenue, Farnborough, Hampshire.

Wanted Amcom DFS from Pace. All my files locked due to changing to Master. Phone: 051-546 8955, Joseph.

BBC micro accessories: Acorn joysticks (pair) £10, data cassette + lead, £20. Monitor stand, £15. 3 years of *Acorn User, Micro User, Beebug* magazines some bound. Offers? Tel: Highcliffe (04252) 71972.

BBC B, data recorder, dust cover and 20 games including *Ravenskull* and *Citadel*, £200. Tel: (0248) 722537.

Teleprinter for BBC B. Can be seen working, £50. Stansted, Essex. Tel: (0279) 812121.

For sale, Solidisk sideways RAM 32k, £35. Ring Jamie on (02214) 2433, after 7pm please.

FREE PERSONAL AD SERVICE

Fill in the form below to a maximum of 20 words (one in each box) and send it to *Acorn User* Free Ads, 141-143 Drury Lane, London WC2B 5TF. Please use capital letters, write clearly, and remember your name, address and telephone number. Without this full information, supplied on a separate sheet of paper, we regret we cannot carry your Free Ad. We cannot accept entries selling or swapping software. This is a service to readers – no companies please. One entry per form only. Free Ads are carried in the magazine as space permits, and any Free Ads not used within a month of receipt will be disposed of.

ACORN USER'S

DIARY

Two micros enter the world

Abuser announces the arrival of two babies this month. First is Kezia, pride and joy of Wimbledon, offspring of Linda and Editor Tony. Many congratulations. Second is 'Archimedes', the pride and joy of Cambridge. But Acorn's super fast ARM processor at the heart of the new machine is already under a cloud.

Product manager David Bell claims to have broken his ARM, and this has cast doubts upon reliability. Apparently poor David fell off a ladder days before the Archimedes launch, and has been encased in plaster from wrist to shoulder ever since. He blames hurrying a DIY job, but says he had to rush as the builder delivered the windows late. Kindly first-aider Bob Coates helped the victim, using his spare shirt to improvise splints.

Storm clouds coming

Abuser presents the fourth in the best-selling back page trilogy. This time it's a one-line flight simulator called *Storm Clouds over Zaqqit*. *Zaqqit* features all-action colour wireframe graphics and full hidden line removal, but only on the cassette inlay.

In fact, it's just another version of the old favourite, *Bomber*; bomb the buildings and land the plane. Type AUTO, then enter the listing (right) carefully, pressing Return at the end, then Escape. Finally, save and run the program.

```
   10 MO.7:F.I=0TO
39:F.J=23-RND(7)TO
22:V.31,I,J,35:N.,
:X=0:Y=0:A=0:B=0:C
=0:REP.V.31,A,B,32
,8,10,C*118,31,X,Y
,62,8:A=A*C-X*(C=0
):B=(B+1)*C-Y*(C=0
):C=C*(B<22A.C)+IN
KEY-99*(C=0):X=-(X
+1)*(X<39):Y=Y-(X=
0):V=?(&7C00+X+I*Y
):V.32:U.V<>32ORY=
22:*FX15
```

People have asked the Diary experts to describe their marketing of games. In fact only the name is important, but all the best names are subject to copyright. We use a random letter generator program 'PARTS-I' to create new words, and those that contain at least a Q or an X are judged by a panel of native Norwegian speakers and cleared by the Esperanto Association.

Raiders of the Arc lost



Anyone bring the *A-Z*?

Picture a summer Tuesday morning, sun still low in the sky. The *AU* hacks set off confidently for the Archimedes launch, to be held not a mile from their London offices. Now picture a summer Tuesday, sun much higher in the sky. Still the *AU* hacks searched for the launch. They knew they'd spot it when they saw it. Up and down Piccadilly they searched, at a loss. Eventually one cried, 'Perhaps we should read the invitation – look, there's an address'.

At length ushered into a packed hall, they were shown the ads which later appeared in the national newspapers. Their hearts fell. Togas and laurel leaves, maybe, but 'Hail' was definitely a *Roman* greeting; Archimedes was a Sicilian, but belongs to the period of *Greek* civilisation. Perhaps it's an ad agency mistake. Perhaps they should have called it Horace.

What's in a name?

Ace reporter Orson Fact's diligent detective work (others know it as 'reading press releases') has revealed that several software houses are at work on products to run on the Archimedes. Chief among them is a new database manager, *Archive*, said to be able to store over a million records. A desktop publishing package, *Archetype*, is almost ready; this wordprocessor allows the text to be printed in a variety of fonts. *Architect*, a CAD package is now nearing completion.

Games ready for release include a chess program, *Archbishop*, and a flight simulator, *Archeaopteryx*, but the first arcade release is likely to be a conversion of the old Orlando favourite, *Arcadians*.

Utilities announced at the *Acorn User* Show included *Archangel*, a RISC version of the *Genie* package, and *Arctic*, a sophisticated front-end for real-time clock.

One of the most interesting developments is a new program, *Archer*, which is said to be able to write novels. Claims that this utilises techniques from the world of artificial intelligence are denied by its backers – one criterion for intelligence is the ability to learn from mistakes.

WE'RE ABOUT TO CHANGE YOUR VIEW OF WORD PROCESSING.

View Professional is the latest addition to the well-known View suite of productivity software.



A highly advanced Word Processor, it also includes spreadsheet and database facilities to form a single, powerful package.

So for example, you could prepare a price list, add it up, create a second column for V.A.T., write a letter around it and send it to a hundred addresses without even switching programs.

Easy to use, View Professional is suitable for the BBC B, B+, Master 128 and Master Compact and costs £99.95. A version for Archimedes will be available later in the year. View it now at your local Acorn dealer.

ACORNSOFT

V I E W P R O F E S S I O N A L

Acorn Computers Ltd., Technopark, 645 Newmarket Road, Cambridge CB5 8PD. Tel: 0223 214411.
Or contact: Vector Services Limited, 13 Denington Road, Wellingborough NN8 2RL. Tel: 0933 79300.

CRAZEE RIDER

FREE: ENHANCED BBC MASTER VERSION
- Extra Race Circuits
- Haunting Music
- Extra Graphics
- Auto-Demo Mode
- Extra Game Features

A PROGRAMMING BREAKTHROUGH
The first Electron motor racing game to faithfully represent the bends and chicanes of major international racetracks.



Setting the Scene



Going round the bend at Misano (BBC MICRO VERSION)



Knocking off an opposing rider (BBC MICRO VERSION)

Clever Electron progamming techniques (ACORN ELECTRON VERSION)

If you can't beat them, knock them off!

Howling round the bends at Le Mans at 150 m.p.h. is a daunting experience. You'll need nerves of steel and slick reflexes to finish in the Top 6 and qualify for the next race. If, at first, you can't make the grade you can always let off steam (and gain bonus points) by bumping into the other riders and knocking them off their bikes; listen for the terrified wail as the rider is sent flying to the ground.

Each race has 60 participants — and the further you get, the tougher the competition becomes. Bonus points are awarded for a good finishing position, and your "hit-count" shown at the top of the screen records the number of other riders you have sent tumbling from their steeds.

Seven top international racetracks are featured:-
- Le Mans (France)
- Anderstorp (Sweden)
- Paul Ricard (France)
- Brands Hatch (U.K.)
- Misano (Italy)
- Silverstone (U.K.)
- Nurburgring (W. Germany)

An enhanced version has been specially produced for owners of the BBC Master Series computers. Included free with all BBC Micro cassettes and discs, this version features several extra race circuits, a beautiful 6-minute musical soundtrack, and a host of extra game features — making full use of the Master's extra memory and capabilities.

BBC Micro Cassette......... **£9.95** Acorn Electron Cassette... **£9.95**
BBC Micro 5¼" Disc....... **£11.95** Acorn Electron 3½" Disc. **£14.95**
BBC Master Compact 3½" Disc **£14.95**

(Compatible with the BBC B, B+ and Master Series computers).

PRIZE COMPETITION

A superb MZ Simson sports moped (illustrated above) worth £500 is the first prize in our competition.

To enter the competition, you must finish in qualifying position on the first 21 racetracks, and note down the congratulatory messages you receive.

Closing Date: 31st March, 1988.





Dept. CR1, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 059458

Please make all cheques payable to "Superior Software Ltd".





24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE
- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

(This does not affect your statutory rights).